Mamiya

SERVICE INSTRUCTIONS

FOR

mamiya DSX / MSX

General provision on mamiya DSX

Trouble Shooting

Repair Manual

Repair Tool List and Special Measuring Instrument List

Mamiya
CAMERA CO. LTD.
TOKYO, JAPAN

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General provision on Mamiya DSX camera

Shutter release and winding mechanism

1. The shutter release button can not be pressed by the action of the release safety mechanism after the shutter release.
2. The shutter release safety mechanism is released when the winding lever is fully advanced, and then the shutter release button can be pressed.
3. The winding lever can not be advanced when the shutter release button is kept pressing.
4. Do not advance the winding lever while the shutter is operating at slow speed. This may result in the trouble. In this case the trouble may be solved by pressing the rewinding button and advancing the winding lever.

Shutter

The standard value of the speed of the shutter curtain is 12.5 ms at 1/500.

Flash synchronization

1. Time lag for FP is between 7 and 15 ms.
2. Two X contacts are provided; one is built into the hot shoe on the top cover and the other is located at the regular place. Both contacts can be used at a time.
   When one of the contacts is used, a electrical shock is felt if touched. In order to prevent this a plastic cover is attached to the hot shoe and the contact at the regular place is dented intentionally.

Self-timer

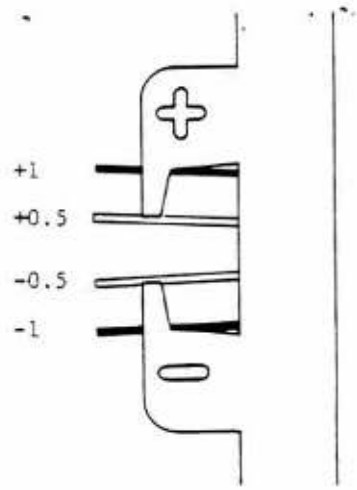
1. The self-timer will be operated when the self-timer lever is rotated more than 90°

Rotation angle	Delay time
90°	5 sec.
180°	10 sec.

2. The shutter does not operate when the winding lever is not fully advanced.

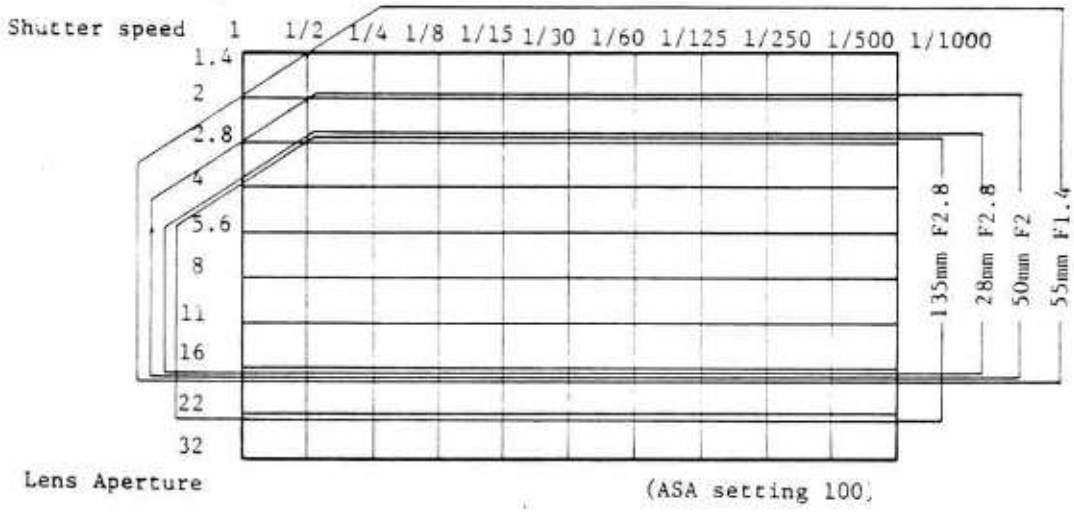
Exposure meter

1. Before repairing, check the type of the battery used in the camera and its voltage. Confirm that the battery is silver oxide type having 1.56 V. (1.58 V under normal condition.) A mercury battery (1.3V) or different type of battery causes inaccuracy of the meter reading or immovability of the meter needle.
2. The meter needle will not move when a battery is put in a battery compartment up side down.
3. The meter reading will not be accurate if the winding lever is pressed at full aperture metering.
4. The meter reading will not be accurate if the winding lever is not fully pressed at stopped down metering.
5. Estimate intentional over or underexposure by 0.5 or 1 step by the eye in the view finder roughly as shown in figure.



6. Meter coupling range is EV 2--EV18 at F1.4 and the ASA speed 100.

Meter's Coupling Range.



7. The meter needle can be centered between the open ends of the index mark even though the dark subject is beyond coupling range with the mater such as EV 1, but the underexposure warning mark will appear at the right side of the view finder indicating that the subject is too dark.
In this case the exposure is insufficient, so use flash bulb or electronic flash as a supplemental light.

Lens mount

1. While mounting the lens, it feels somewhat heavier just before the stop position due to the mount spring pressure. The lens stops in place facing the lens index up ward.
2. The meter reading will not be correct if SX lens is mounted keeping the lens release button pressing, because the lens stops beyond in place position.
3. Universal thread mount lens without special process can be used at stopped down metering.

Visual field of the view finder

Average ratio of visual field is 92%.

Winding & Rewinding

Defect	Possible Cause	Reference Page
Fail to wind	TL1318 Winding stop lever ... Improper operation and/or out of position	20
	TL1323 Ratchet pawl ... Out of position	18,19
	TL1471 Anchor escapement off-gear ... Out of position	28,29
	TL1455K2 Start wheel assy. ... Out of position	31
	Malfunction of OTL2100 Mirror housing	46
	Malfunction of Shutter	30
	Tight Aperture linking pin of lens	53
Not smooth winding	TL1762K2 Transmission lever assy. ... Out of position	26
	Winding stop lever ... Improper operation and/or out of position	20
No film transported	TL1353K2 Winding arm assy. ... Out of position	
	TL1395K2 Sprocket shaft assy. ... Imperfect return	23,24
Imperfect return of Winding lever	TL1339 Winding spring ... Breakage	24
	TL1336K2 Winding shaft assy. ... Improper operation	21
With depressing Switch button, fail to retract Winding lever	TL1943K2 Switch lever assy. ... Improper operation	15,24
Windable when depressing Shutter release button	Winding stop lever ... Improper operation and/or out of position	20
Multiple depression of Shutter release button possible.	TL1411 Safety arm ... Improper operation	21
Overlap	Safety arm ... Out of position	21
Fail to rewind	TL1381 Change-over lever ... Improper operation	23
	TL1346 Film spool ... Imperfect rotation	24

Exposure counter

Immovable Exposure counter from "S"	Worn stopper of TL1511K2 Exposure counter	
	TL1521 Feeding ratchet ... Out of position	22
Immovable Exposure counter from the middle	Worn tooth of Exposure counter	
	Feeding ratchet ... Out of position	22
	Pawl ... Out of position	
Fail to return to "S"	TL1516 Spring ... Out of place	
	Exposure counter ... Stain of oil	
	TL1527 Returning lever ... Out of position	22

Back cover

Fail to open.	OTL1221K2 Back cover latch ... Lack of stroke	
Fail to lock.	Back cover latch ... Improper operation	24

Shutter

Fail to coincide with shutter speed dial.	OTL1789K2 Chainlet ... Out of place	
	OTL1777 Shutter speed disk ... Out of place	
Keep B opening.	TL1458 Leaf spring ... Improper operation	16,25

Defect	Possible Cause	Reference Page
Irregular shutter speed at B	TL1745K2 Speed adjusting lever assy. ... Improper operation	25
	TL1711K2 Release lever assy. ... Improper operation	
	TL1717 Spring ... Lack of tension	
Irregular slow speed	Rivetted screw of TL1753K2 Slow speed arm assy. ... Imperfect adjustment	26
	TL1765 Adjusting screw ... Imperfect adjustment	28,29
	Malfunction of TL2500 Governor	
Inaccurate shutter speed	Imperfect adjustment	
Exposed picture uneven	Bounce of first curtain and/or second curtain	27
	Slow operation of diaphragm leaf	28,29,33
Inoperative shutter release	TL2171 Shutter off lever ... Improper operation	
	Defective shutter curtain	30,46
	Self-timer	
Not setting	Defective self-timer	
Stop at operation	Defective self-timer	
Fail to link with shutter	TL1931 Release lever ... Imperfect adjustment	33
	Flash synchronization	
Inflammation at the time of socket insertion	Short circuit of wires	
	TL2411 Synchro contact assy. ... Imperfect adjustment	34
No synchronization	No induction	
	Synchro contact assy. ... Imperfect adjustment	34
No synchronization at X	Synchro contact assy. ... Imperfect adjustment	
	Inaccurate shutter speed at 1/60	25,34
	Mirror housing	
Mirror rise with winding	Defective Mirror housing	46
Fail to raise mirror	Defective Mirror housing	46
Keep Mirror rising	Strong brake of second curtain	27
	Exposure meter	
Immovable meter needle	Disconnection of main switch	35
	Imperfect adjustment of A/S switch	
	Meter needle ... Out of position	41,42
	Improper operation of Meter drum	
	Malfunctioned of Meter drum	
	Short circuit of Printed circuit with resistor	38
Meter needle caught	Meter needle ... Out of position	38
	Malfunctioned of Meter drum	
Incorrect meter reading at full aperture metering	Improper operation of Aperture linking ring	
	Imperfect soldering or disconnection of Printed circuit with resistor	38
	Imperfect adjustment of brightness	37

Defect	Possible Cause	Reference Page
Incorrect meter reading at stopped-down metering	Imperfect adjustment of stopped-down aperture	43
	Imperfect soldering or disconnection of printed circuit with resistor	38
	Imperfect adjustment of full aperture metering	42,43
Incorrect exposure	Inferior CdS	43,44
	Inaccuracy of shutter speed	25,26
	Incorrect diaphragm diameter of lens	55
Fail to switch off	Imperfect adjustment of main switch	55
Underexposure warning mark fails to appear	Improper operation of Meter drum	41,42
	Improper operation of Underexposure warning mark	45
Immovable A/S indicator	Not smooth movement of Chainlet and/or switch	45
	View finder & Focusing	
Out of focus at infinity	Incorrect flange back of camera body	48,49
	Imperfect adjustment of the position of Condenser lens	50,51
	Imperfect adjustment of lens infinity	54
Vague focusing at infinity and shortest distance	Incorrect flange back of camera body	
	Imperfect adjustment of the position of Condenser lens	50
Vague focusing at infinity	Imperfect adjustment of lens infinity	54
	Lens aperture & Focusing	
Fail to stop down	Improper operation of aperture blade	
	Oil sticking to aperture blade	
Slow turn of aperture ring	Loose spring of aperture ring	55
Out of focusing position at infinity	Incorrect attachment of focusing ring	54

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1. Removing and assembling parts relative to OTL1811K2 Top cover assembly, OTL1821K2 Bottom cover assembly and OTL1851 Front cover

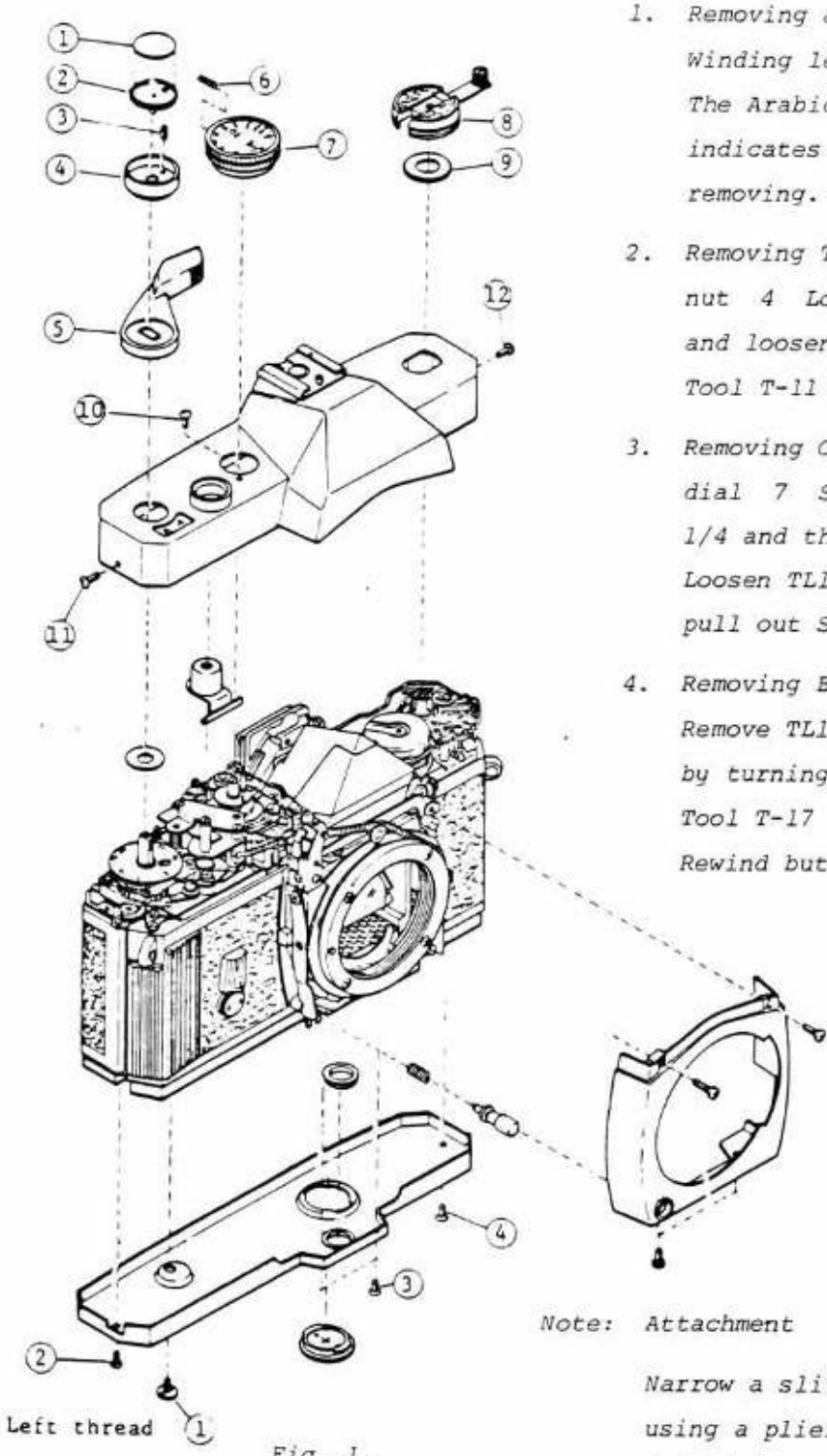


Fig. 1.

1. *Removing and assembling OTL1312K2 Winding lever assembly*
   The Arabic numeral in a circle indicates the procedure of removing.
2. *Removing TL1328 Winding Lever nut 4 Loosen AS2x2 Setscrew 3 and loosen Winding lever using Tool T-11 Spanner clockwise.*
3. *Removing OTL1776K3 Shutter speed dial 7 Set Shutter speed dial to 1/4 and the ASA speed 80. Loosen TL1778 Setscrew 6 and pull out Shutter speed dial.*
4. *Removing Bottom cover assembly*
   Remove TL1835 Rewind button 1 by turning it clockwise using Tool T-17
   Rewind button pin-faced driver.

Note: Attachment

Narrow a slit of Switch button using a plier and squeeze it into Switch lever assembly.

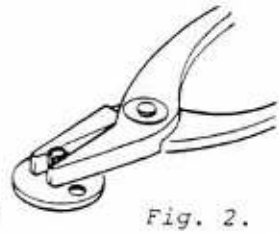


Fig. 2.

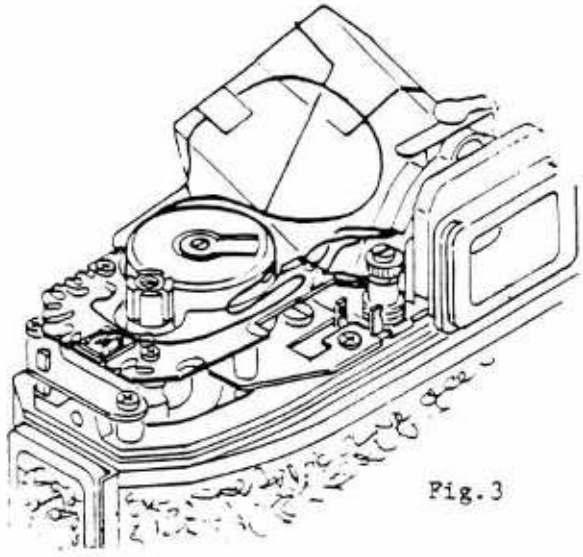


Fig.3

A. Assembling Top cover assembly

Confirm the followings and assemble it in the reverse order of the Arabic numeral in a circle.

a. OTL1789 Chainlet operates accurately.

b. The wires connected with Meter drum are positioned as shown in Fig. 3

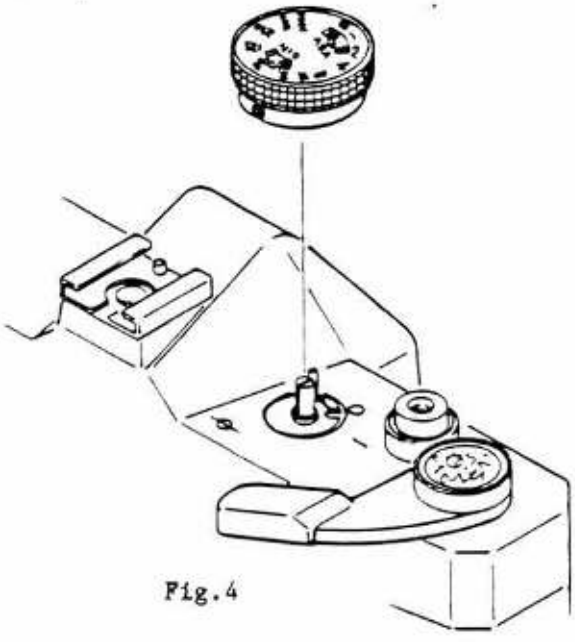


Fig.4

B. Attaching Shutter speed dial

1) Set the ASA speed to 80 and TL1725K2 Shutter speed cam assembly 1/4.

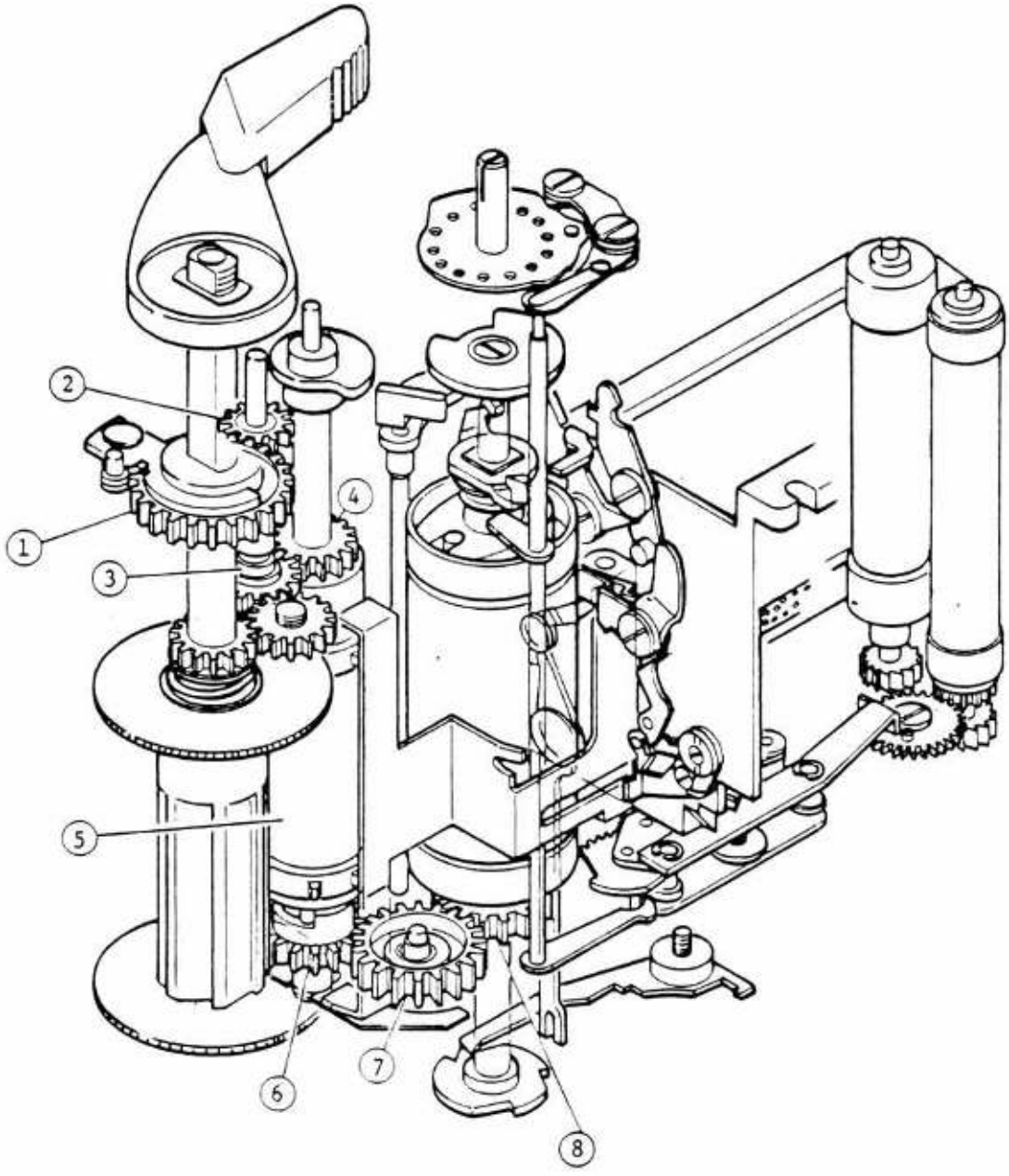
2) Turn OTL1781K2 Pulley assembly for approximately 360° counterclockwise from the position where Chainlet is not wrapped round Pulley assembly as shown in Fig. 4

3) Insert Shutter speed dial into Pulley assembly at the position.

C. Removing Front cover

Front cover can be removed without removing TL2942 A/S switch knob.

2. Winding Mechanism



The Arabic numeral in a circle indicates the continuaus operations of the Winding mechanism.

A-1 Adjusting OTL 1323 Ratchet pawl New type

Easy adjusting method for Ratchet pawl was modified November, 1974.

1. *Keep Winding lever advancing fully.*

2. *Position the tip of OTL 1323 Ratchet pawl and the winding gear of TL1313K2 Winding base plate assembly by turning OTL 1325 Eccentric collar as shown in Fig. 1.*

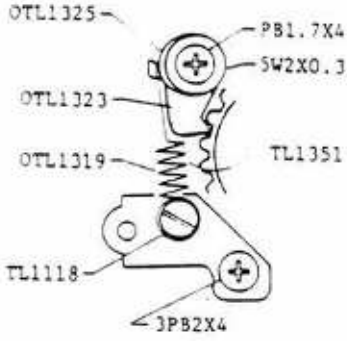


Fig. 1

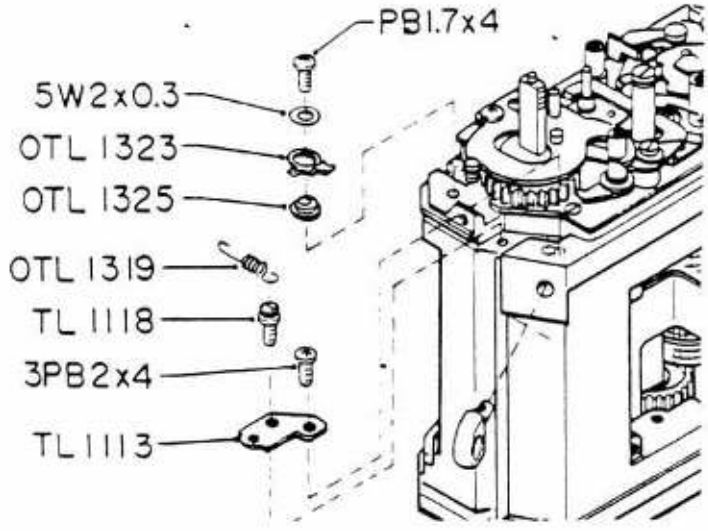
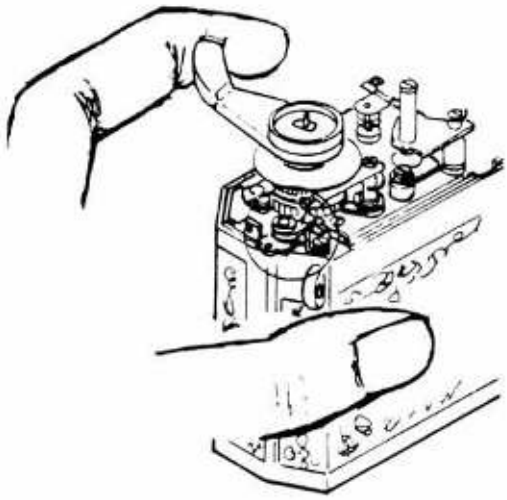


Fig. 2

A-2. Adjusting TL1323 Ratchet pawl Old type



1. Keep Winding lever advancing fully.

A

Incorrect

2. Position the tip of Ratchet pawl and the winding gear of TL1313K2 Winding base plate assembly by turning TL1325 Eccentric collar as shown in Fig. B.

The shutter release is not smooth after advancing Winding lever strongly.

B

Correct

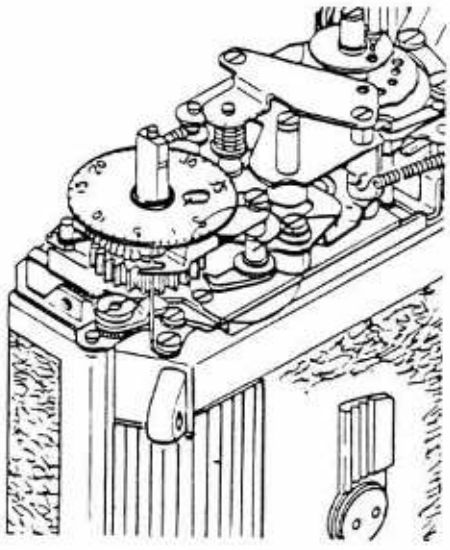
C

Incorrect

The high shutter speed becomes unstable.

3. Take off Winding lever and adjust their positions as shown in Fig. B if they are positioned as shown in Fig. C.

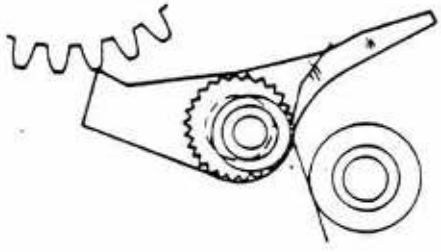
B. Adjusting TL1318 Winding stop lever



Advance Winding lever and position Winding stop lever as shown in Fig. B. by turning TL1325 Eccentric collar while keeping Shutter release rod pressing.

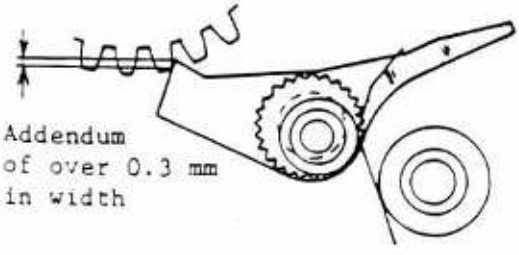
Note: Confirm that Winding stop lever is out of contact with the winding gear of Winding base plate assembly while advancing Winding lever when Shutter release rod returns to the original position calmly.

A



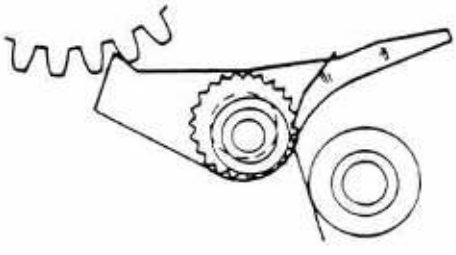
Incorrect

B



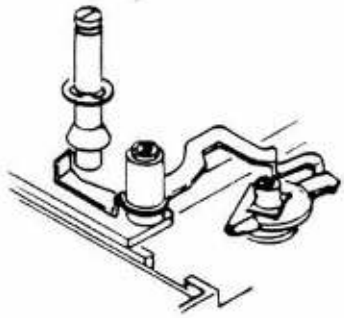
Correct

C

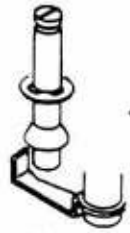


Incorrect

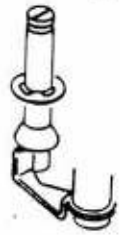
C. Adjusting TL1411 Safety arm



1. Advance Winding lever.
2. Bend the tip of Safety arm so as to keep away from TL1913 Shutter release rod when Shutter release rod can not be pressed.
3. Adjust Safety arm so as to operate correctly when Shutter release rod can be pressed after releasing Shutter release rod.

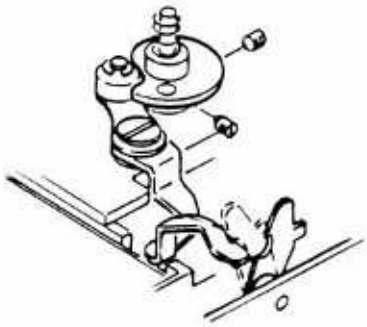


After winding



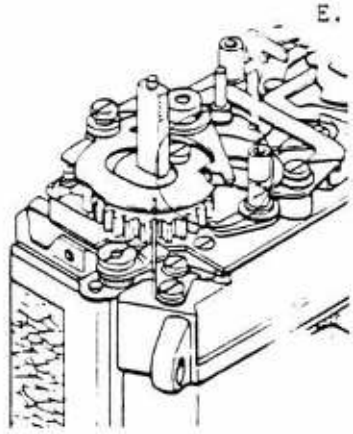
After releasing the shutter

D. Adjusting TL1671K2 Mirror charging lever



1. TL1676 Roller must be positioned at the lowest part of TL1673 Charging cam while keeping Winding lever advancing fully. If not so, the lever of Mirror housing can not be set correctly.
2. Position Charging cam and tighten 1 piece of As1.7x1.4 Setscrew. Then tighten another Set-screw in the midst of advancing Winding lever and fix them by applying cement.
3. Confirm that Mirror charging lever can move beyond the position where Mirror housing is completely set after adjusting.
   The position of the mirror setting can be judged by a click of the spring of TL2161 Release lever in the midst of the setting.
4. Replace Release lever or bend it in the direction of increasing the setting amount when TL1671K2 Mirror charging lever assembly does not move exceedingly.

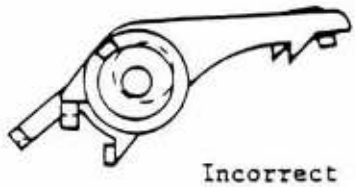
E. Adjusting TL1511K2 Exposure counter



A

Adjusting the positions of TL1521 Feeding ratchet and TL1522 Pawl

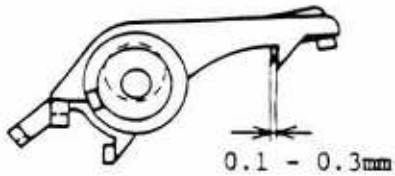
1. Close Back cover and keep Winding lever advancing fully.



Incorrect

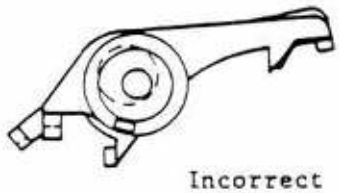
B

2. Turn TL1332 Eccentric collar and tighten TL1333 Setscrew at the position where the end of Feeding ratchet projects approximately between 0.1 and 0.3 mm beyond the end of Pawl in the midst of a transition from figure C. to figure A.



Correct

C



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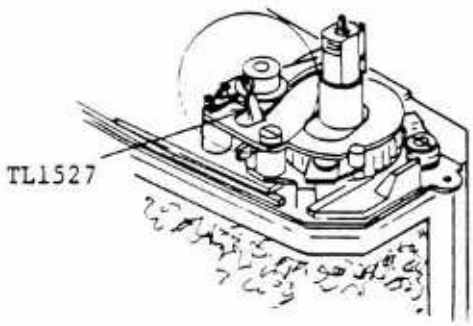
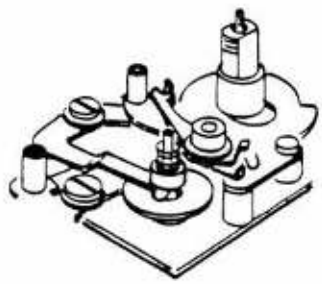


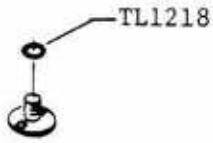
3. Exposure counter returns to "S" by releasing Feeding ratchet and Pawl from the gear of Exposure counter when opening Back cover. Adjust the then position by bending TL1527 Returning lever.

4. Fix Setscrew, OTL1528 Spring and OTL1523 Spring by applying glue.

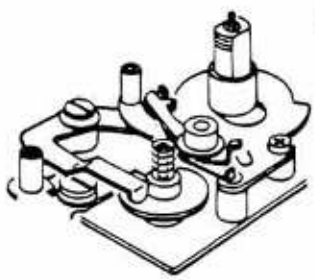
F. Adjusting TL1381 Change-over lever



1. Sprocket must move freely while keeping Rewind button pressing.



2. Increase a stroke of TL1395K2 Sprocket shaft assembly by adding TL1218 Washer so that Change-over lever comes to the position beneath TL1376 Clutch screw when Sprocket does not move freely. Confirm the operation of Change-over lever when Sprocket does not move freely in spite of increasing a stroke.



3. After advancing Winding lever, Change-over lever is released from Clutch screw and Sprocket does not move freely.
   Sprocket shaft assembly does not function properly in case Sprocket moves freely.
   (Refer to item of Sprocket assembly.)

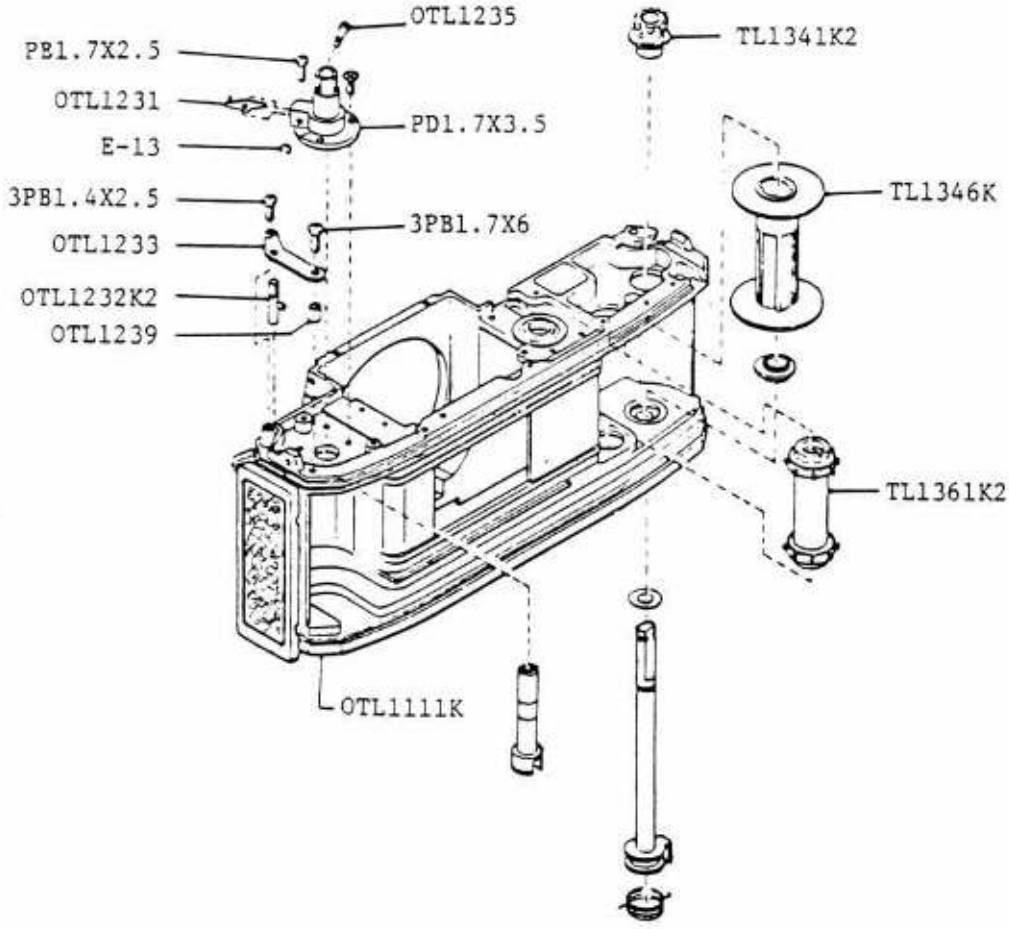
G. TL1346K2 Film spool, TL1361K2 Sprocket assembly and OTL2212 Rewinding shaft

1. Film spool

Film spool can be removed after removing TL1531K2 Counter base plate assembly, OTL1733K2 Shutter base plate assembly, TL1313K2 Winding base plate assembly and TL1336K2 Winding lever shaft assembly in order.

2. Sprocket assembly

Sprocket assembly can be removed after removing Mirror housing and Bottom base plate with Shutter curtain drum assembly.



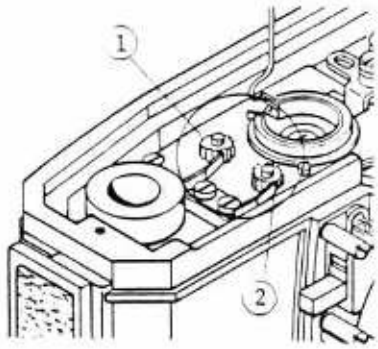
3. Rewinding shaft

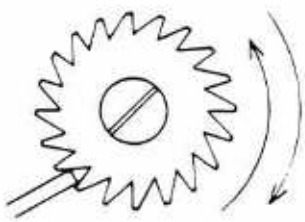
Rewinding shaft assembly can be removed after removing OTL2951 Meter base plate with Meter drum.

Note: 1. When assembling Winding shaft assembly, keep an up-and-down motion of the shaft between 0.1 and 0.2 mm by using 10W5x0.1 or 10W5x0.2 Washer.

2. When assembling Sprocket assembly, keep an up-and-down motion between 0.05 and 0.25 mm by using 6W3x0.1 or 6W3x0.2 Washer.

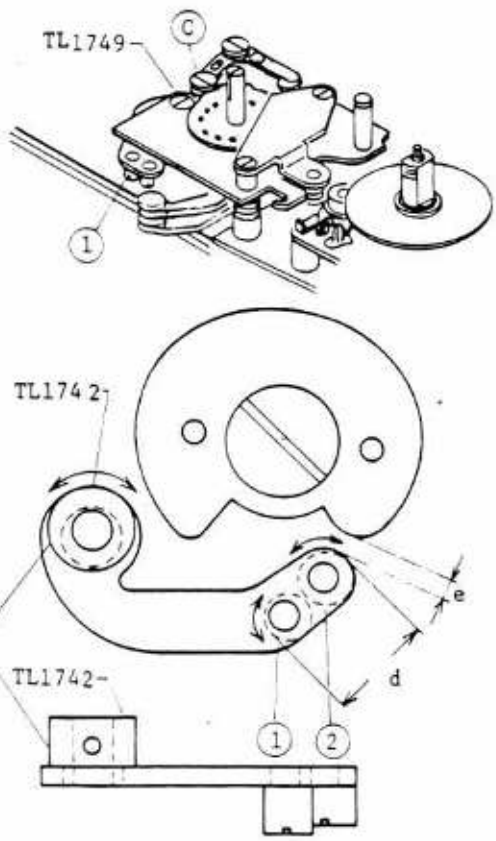
3. Shutter mechanism





A. The speed of the shutter curtain

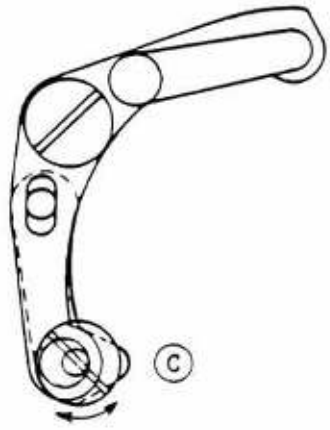
1. The standard value of the speed of the shutter curtain is between 12.0 and 12.5 ms at 1/500.
2. TL1661 Spring adjusting gear (1) is used for adjusting the speed of the first curtain. Spring adjusting gear (2) is used for adjusting the speed of the second curtain.
3. The shifting of one tooth for both gears varies the speed of the shutter curtain by approximately 0.1 ms.
4. A counterclockwise turn of Spring adjusting gear increases the speed of the shutter curtain.



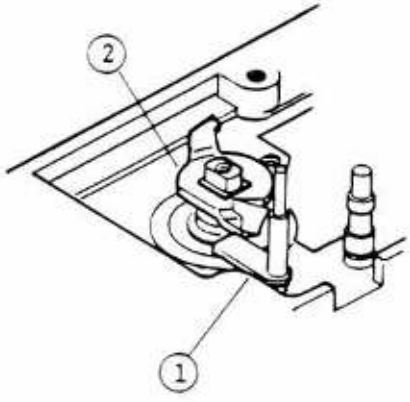
B. Adjusting the high shutter speed

1. 1/60 - 1/250 sec.
   Change the width "d" by turning the high speed rivet (1) of TL1745K2 Speed adjusting lever assembly using Tool T-14 Adjusting driver.
2. 1/500 - 1/1000 sec.
   a. Loosen TL1749 Screw and put a mark indicating the position of a small hole of b TL1742 Eccentric collar on shutter base plate for a guide of a turning volume.
   b. Change the width "e" by turning Eccentric collar.
3. When the high shutter speed can not be adjusted by (1) and (2) mentioned above, adjust it by turning the high speed rivet (2)
4. Apply glue to the rivetted part after adjusting the high shutter speed by turning the high speed rivet (1) and/or (2).
5. When the pictures taken at the high shutter speed of 1/1000 or 1/500 are uneven, adjust the speed of the first curtain.

C. Adjusting the slow shutter speed

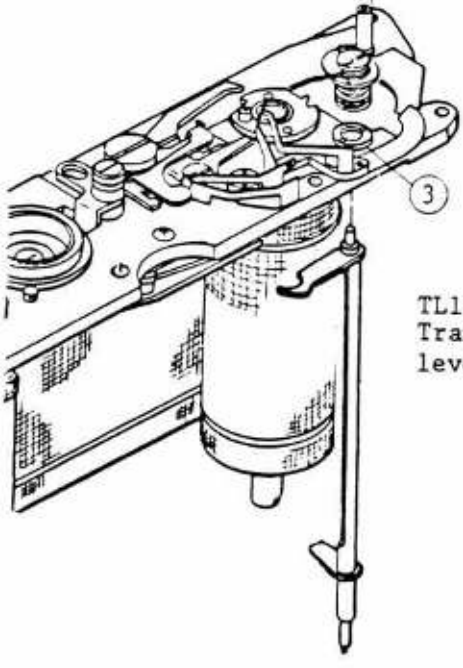


1. Adjust the shutter speed of 1/4 by turning the rivetted screw (C). Check to see whether other shutter speeds except 1/4 are correct after adjusting the shutter speed of 1/4.



2. Upper arm of Transmission lever assembly (1) will be lifted up Rear curtain lever (2) when they hit in the midest of winding within the shutter speed of 1 - 1/30. When the shutter is released, (1) does not go up but to turn. In order to satisfy the above conditions, adjust the position of Transmission lever assembly by turning TL1765 Adjusting screw (3)

   Note: If the position of Transmission lever assembly is incorrect, (1) and (2) may bind at 1/8 when winding or may slip the shutter speed at 1/30.



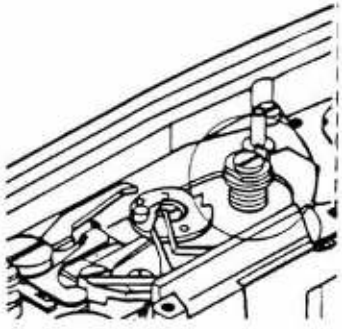
TL1762K2
Transmission
lever assembly

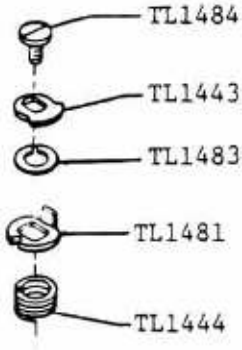
3. (1) must not be in contact with (2) at the shutter speed faster than 1/60.

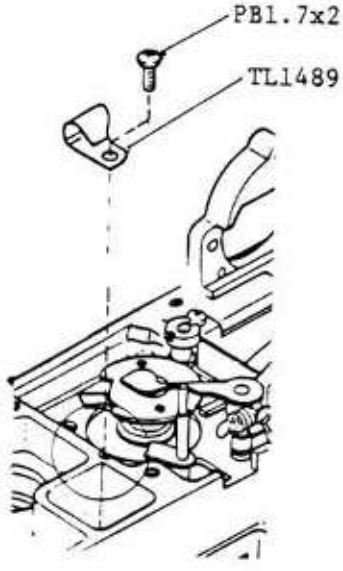
D. Adjusting the bounce of the shutter curtain

A. Adjusting the brake of the first curtain

1. Remove Bottom cover.
2. Replace TL1444 Spring or widen TL1443 Braking disc using a chisel as shown in figure.
3. The first curtain will remain in the area of the picture frame in case the brake is too strong.



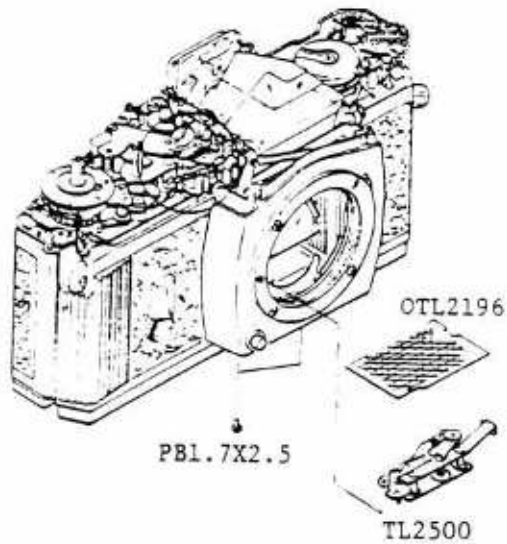




B. Adjusting the brake of the second curtain

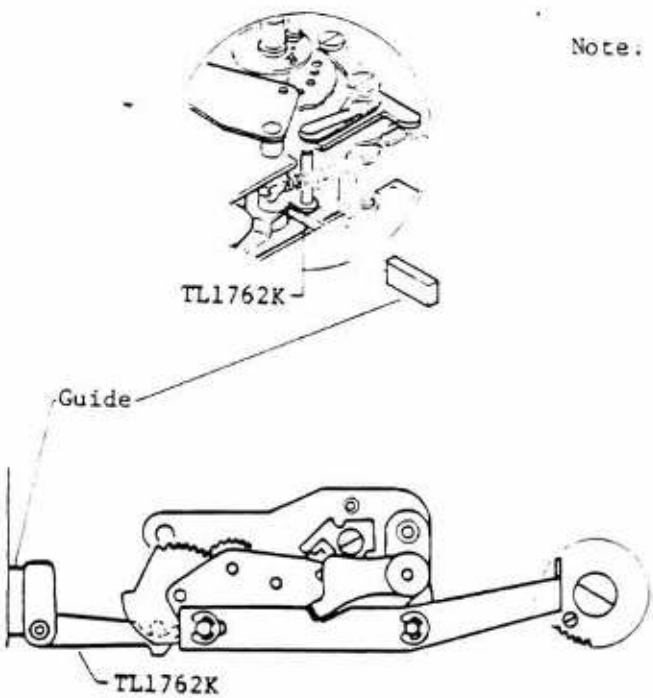
1. The second curtain will be more braked by bending TL1489 Braking spring upward.
2. When the brake is too strong, the second curtain will remain in the area of the picture frame and Mirror will not return to the original position after releasing the shutter speed at B.

E-1 Replacing TL2500 Governor New type



Governor can be removed without removing mirror housing assembly due to the modification of mirror housing assembly.

Governor can be removed after removing Bottom cover and 2 pieces of PB1.7X2.5BMi Screw.
Remove OTL2196 Reflection absorber and Governor can be removed.



Note. Insert guide into the part of Upper arm of Transmission lever assembly so that Lower arm can be positioned rightly as shown in the figure before assembling.

As to the adjusting method, please refer to Note of page 22.

E-2 Replacing TL2500 Governor Old type

1. Remove Mirror housing.
   (Refer to item of Mirror housing.)

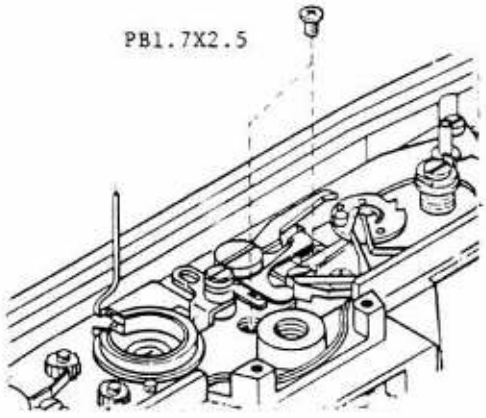


Fig.1

2. Governor can be removed after removing Bottom cover and 2 pieces of PB1.7x2.5BNi Screw.

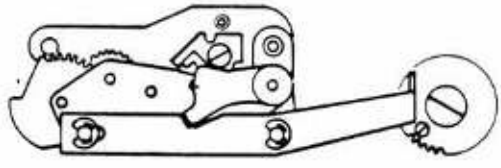
Note: Take care the followings when assembling.

a. Position TL1762K2 Transmission lever assembly against Governor as shown in Fig. 4 when Shutter speed dial is set to the slow speed than 1/4.

b. Position the pin of TL1471 Anchor escapement off gear as shown in Fig. 3.

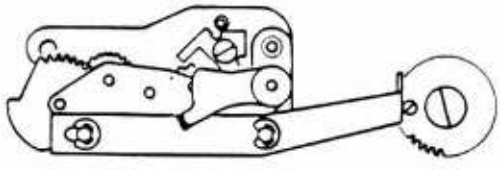
c. Confirm the operation of the shutter and accuracy of the shutter speed after assembling.

d. Fix Screw built into Governor and Anchor escapement off gear by applying cement.



After winding

Fig. 2



After releasing the shutter

Fig. 3

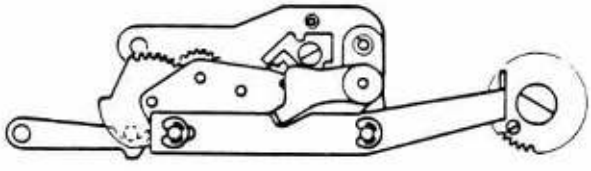
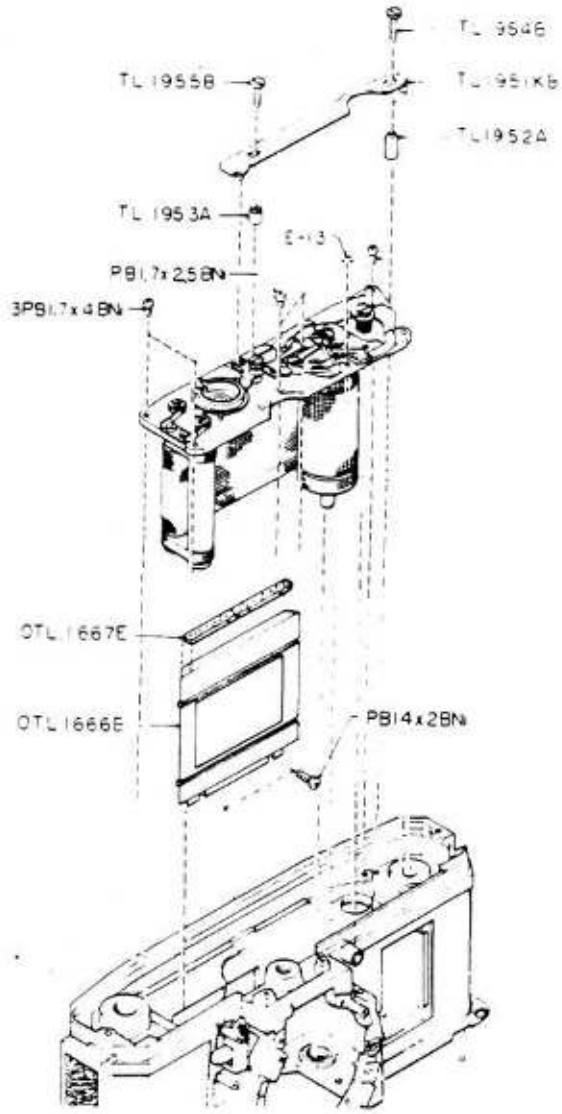


Fig. 4

F. Replacing TL1600 Shutter curtain drum assembly



A. Removing procedure

1. Remove Mirror housing. (Refer to item of Mirror housing.)
2. Remove TL1722 Screw and TL1724K2 Front curtain cam.
3. Remove PB1.4x2 Screw and OTL1666 Sealing frame.
4. Remove Bottom cover, 3PB1.7x4BNi Screw, TL1948 Anchor and E-13 E-ring.
   Then remove shutter curtain drum assembly with Bottom base plate assembly.

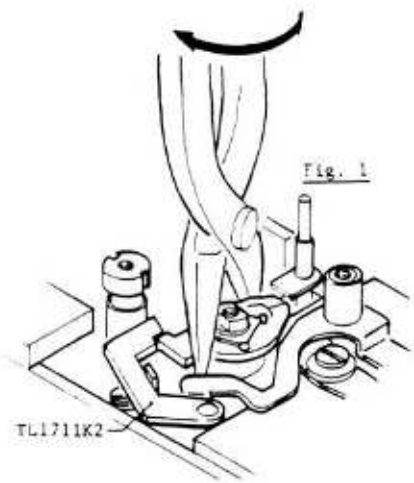


Fig. 1

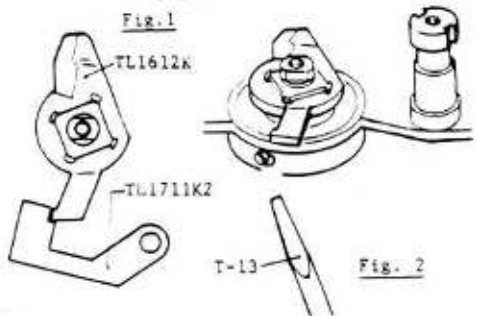


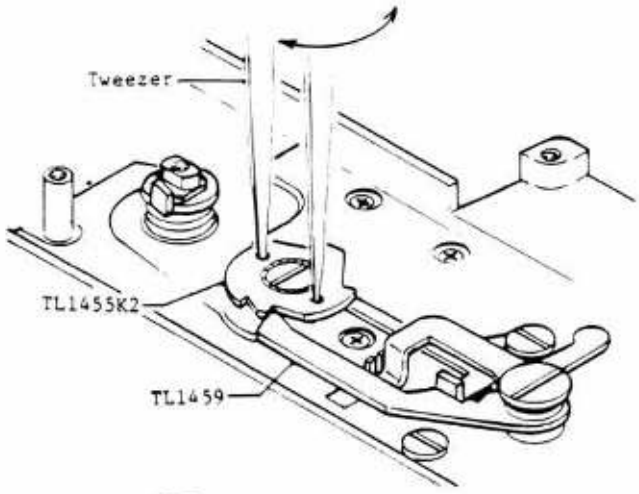
Fig. 2

B. Assembling procedure

Assemble it in the reverse order outlined above.

C. Adjusting Shutter curtain drum assembly

1. Position TL1612K2 Rear curtain lever using TL1711 Release lever assembly as shown in Fig. 1 while keeping Winding lever advancing fully. And fasten TL1614 Linking coupler with TL1615 Screw at the position as shown in Fig. 2.



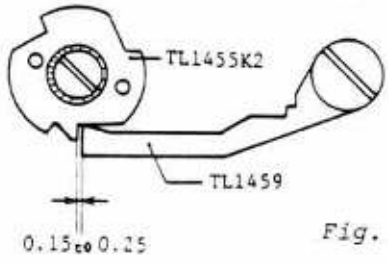
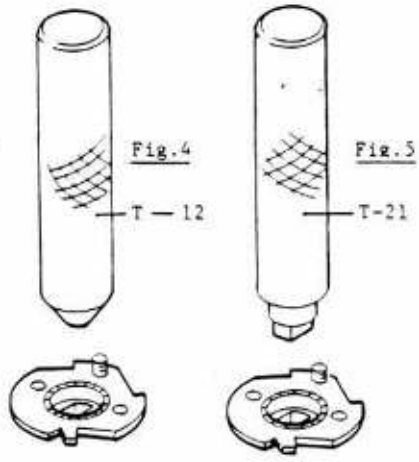


Fig. 3



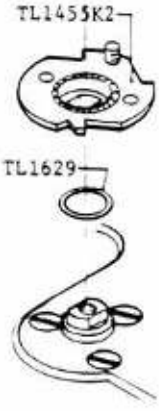


Fig. 6

2. *Position TL1455K2 Start wheel assembly and TL1459 Starting pawl as shown in Fig. 3 while keeping Winding lever advancing fully. After positioning, remove Start wheel assembly and rivet Start wheel to TL1456 Hub using Tool T-12 Calking tool so as not to move as shown in Fig. 4. Narrow the hole connecting Hub of Start wheel with Shaft of Shutter curtain drum assembly using Tool T-21 Special tool, if necessary, so as to connect tightly as shown in Fig. 5. Tighten TL1457 Screw and apply a gule to it. Adjust clearance using TL1629 Washer as shown in Fig. 6 in case there is much clearance between Start wheel assembly and Shutter curtain drum assembly.*

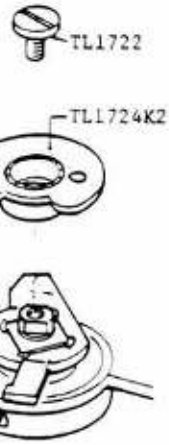


Fig. 7

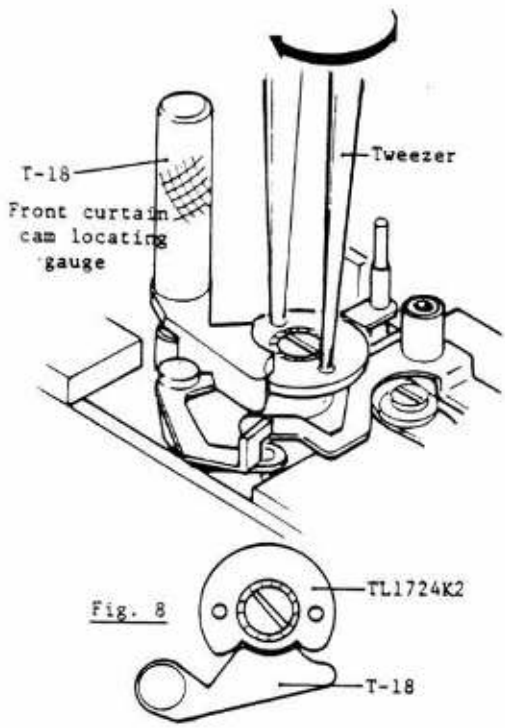


Fig. 8

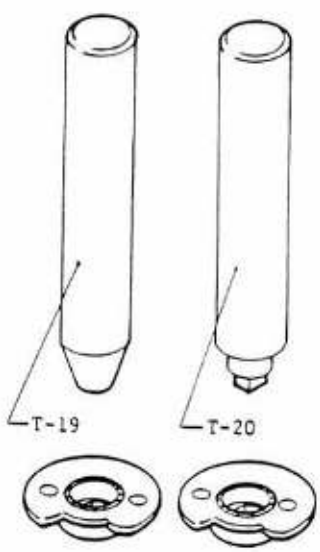
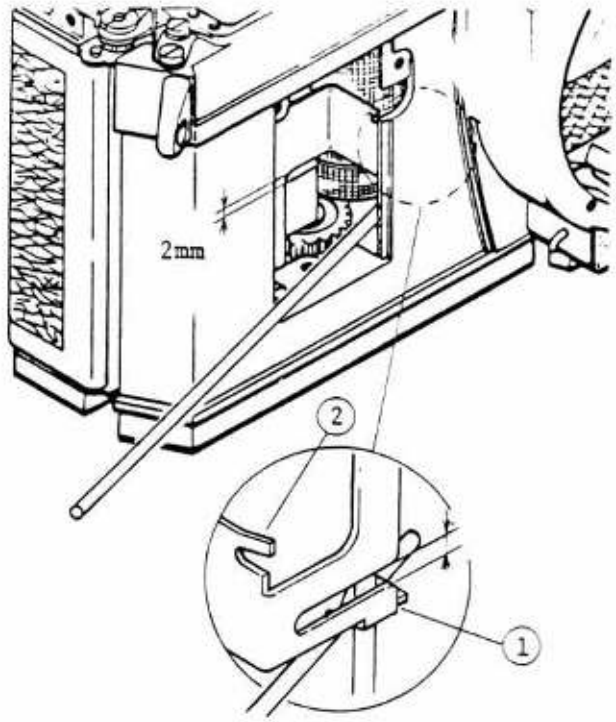


Fig. 9 Fig. 10

3. *Slip TL1724K2 Front curtain cam on to TL1621 Shaft of Shutter curtain drum assembly and tighten TL1722 Screw as shown in Fig. 7.*
Insert T-18 Front curtain cam locating gauge into the hole of TL1741 Post screw of Speed adjusting lever. Position Front curtain cam so as to fit T-18 Front curtain cam locating gauge while keeping Winding lever advancing fully as shown in Fig. 8. After positioning, remove TL1722 Screw and Front curtain cam. Rivet Cam to Hub using T-19 special punch as shown in Fig. 9.
Narrow the hole of Shutter curtain drum assembly using Tool T-20 Special punch as shown in Fig. 10. If necessary, so as to connect tightly. Fix Front curtain cam on Shaft of Shutter curtain drum assembly and tighten Screw and apply glue to Screw.

G. Adjusting TL2600 Self-timer



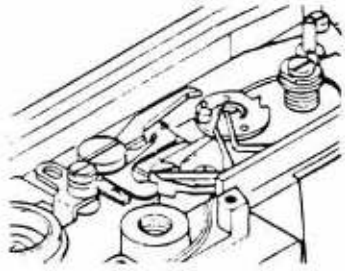
1. TL1931 Release plate must be completely adjusted before attaching Self-timer.

2. The shutter must be released when Release plate moves 2 mm from the position where the shutter releasing line is marked. This adjustment can be done by bending the part (1) of Release plate up and down with a rod inserting from the side as shown in figure.

3. Keep the self-timer operating lever at up position when attaching it.

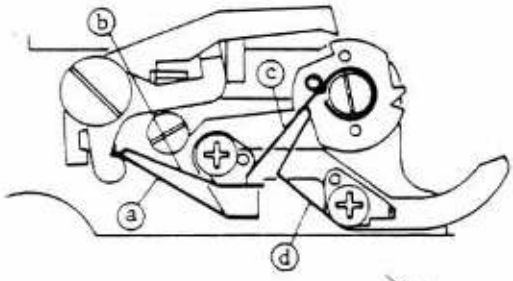
4. Adjust the position of the shutter release by bending the part (2) up and down.
   Self-timer may not operate or the shutter speed may be disordered due to fast release when the lever is bent too upward.

H. Adjusting the flash synchronization

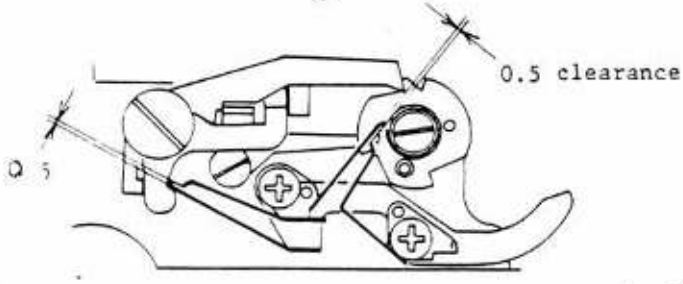


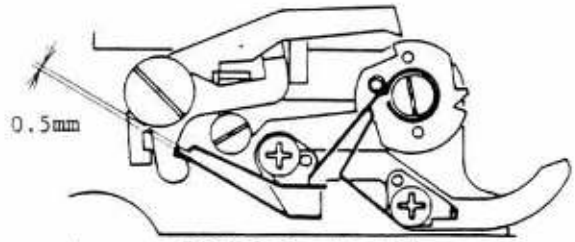
FP contact

1. Each contact must not be dirty or burnt down. The pin of TL1455 Start wheel is covered with insulating tube. Each contact in operation must not touch with the body.



2. Four contacts ⓐ and ⓑ for FP, and ⓒ and ⓓ for X must be enough in contact with each other when the shutter is operating at B.

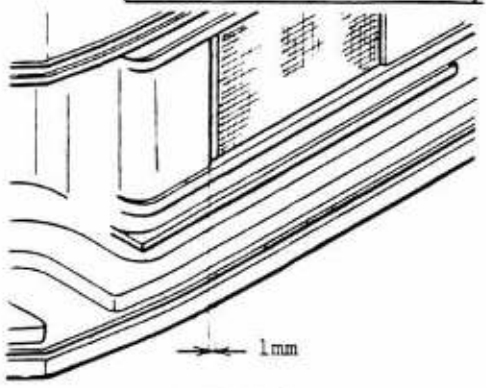


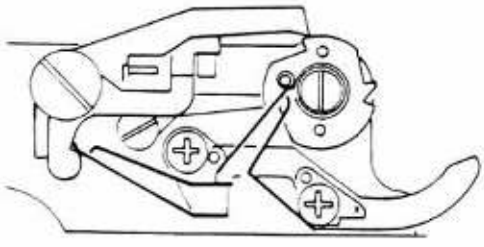


3. FP contact must keep the space of 0.5 mm when the shutter release finishes. If not so, flash bulb (FP) as well as electrical flash (X) is inflammed when the flash cord is inserted into flash terminal.

X contact

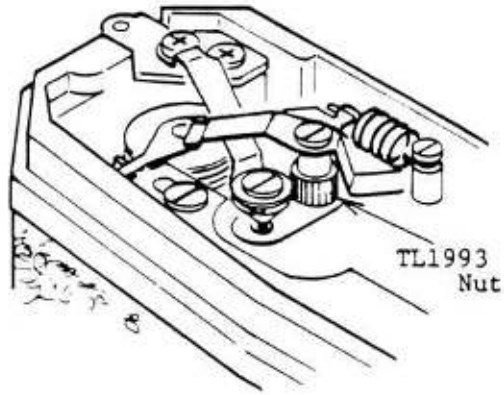
1. There must be a space of 0.5 mm between the contacts ⓒ and ⓓ when Winding lever is advanced and the metal frame of the shutter curtain becomes to appear.





2. In case the shutter speed is faster than 1/60 sec., the shutter curtain may not open fully. As a result of it, flash synchronization may be imperfect even though the adjustment of contact is perfect.

4. Exposure meter



A. Adjusting the main switch

a. Adjust the space between TL1994 Switch contact and TL1995K2 Switch contact arm assembly by turning TL1993 Nut.

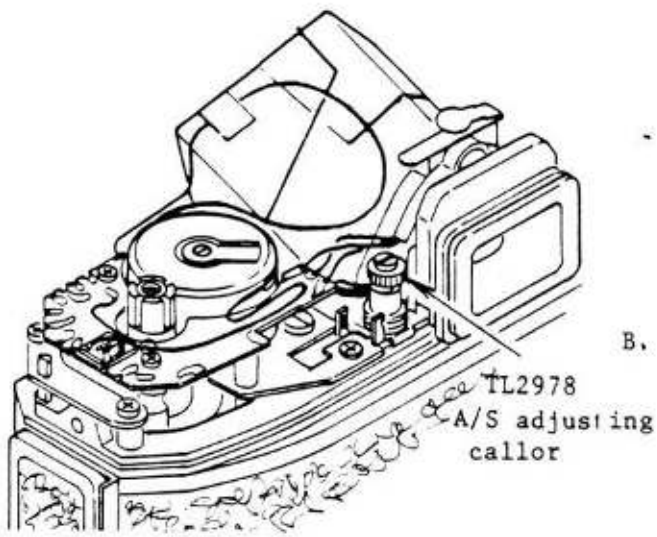
b. Apply cement to the head of Nut after adjusting.

Note: 1. When switching on the meter, Switch contact arm assembly must be in contact with Switch contact and press it.

2. When switching off the meter, Switch contact arm assembly must be out of contact with Switch contact.

3. The contacting point must be free from oil and stain.

4. Switching on and off must be secure even when Winding lever shaft moves up and down.

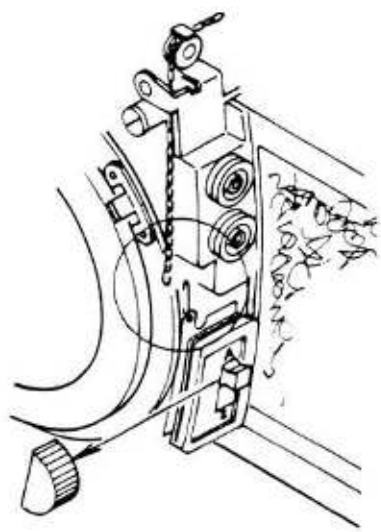


B. Adjusting A/S change-over switch

A. Adjusting the position of A/S indicator

1. Fine adjustment
   Turn TL2978 A/S adjusting collar.

2. Major adjustment
   Change the position of TL2956 Chainlet hooked on TL1914 Chain ring.



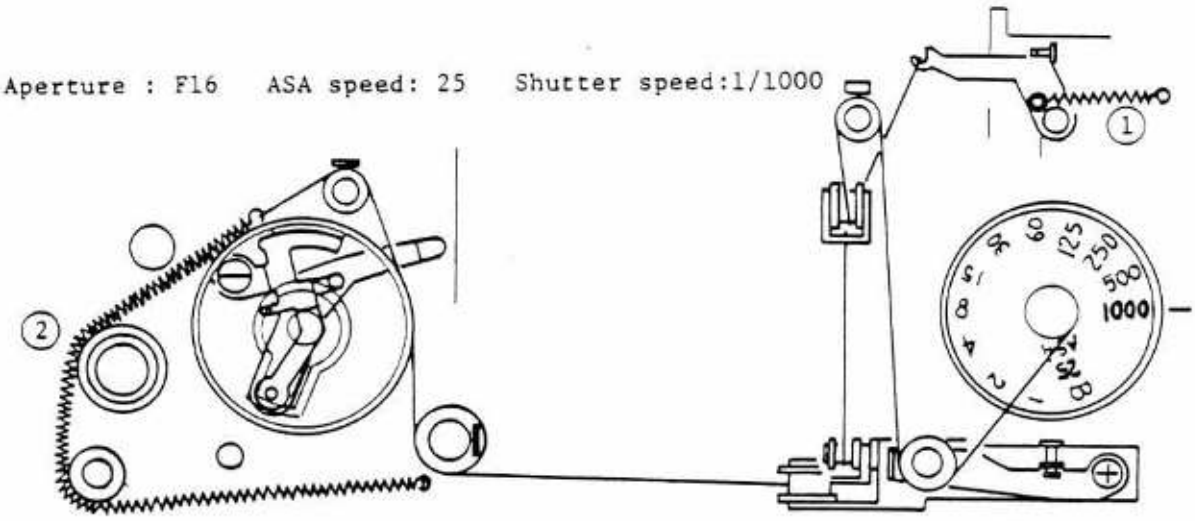
B. Removing and attaching TL2942 A/S switch knob

1. Removal
   Pull out it in the direction of the arrow as shown in figure.

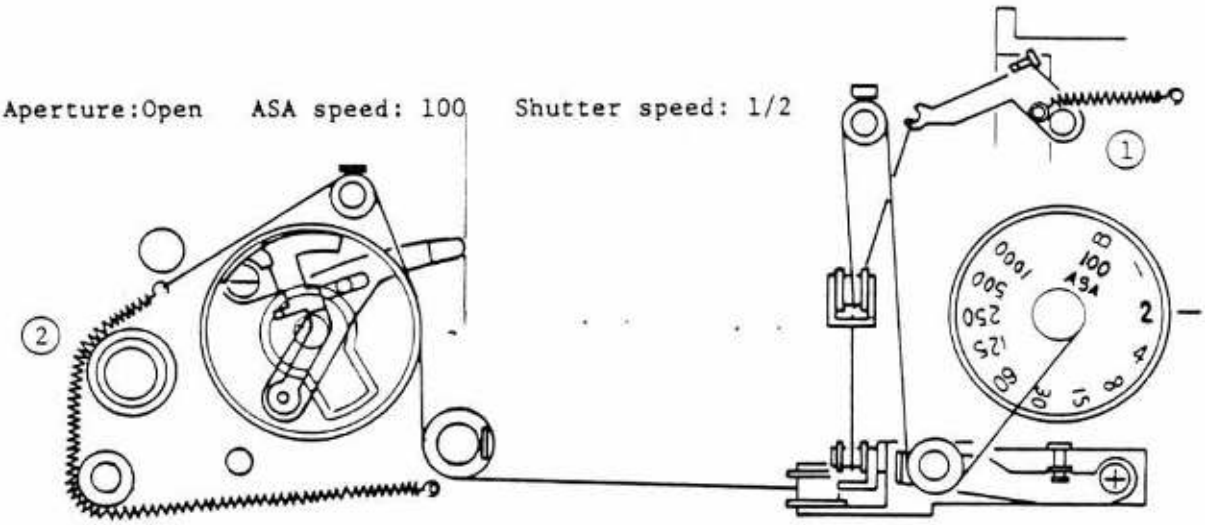
2. Attachment
   Apply a small quantity of glue to the slit and squeeze it into OTL2941-3 Switch.

C. Functions of Meter drum and Underexposure warning mark for 1000DSX

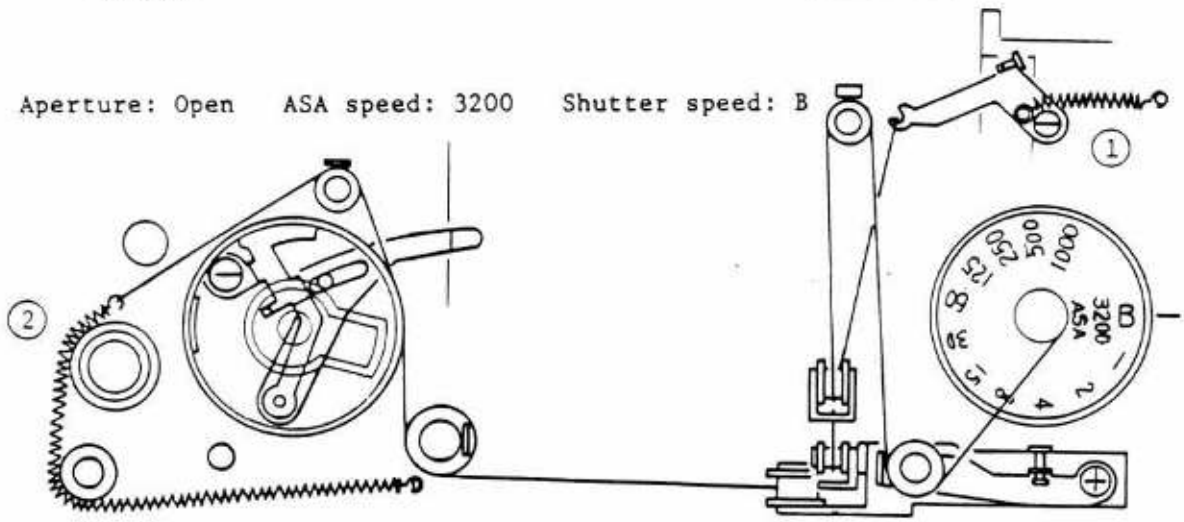
Aperture : F16 ASA speed: 25 Shutter speed:1/1000



Aperture:Open ASA speed: 100 Shutter speed: 1/2



Aperture: Open ASA speed: 3200 Shutter speed: B



a. Tension of OTL2179 Spring (1) must be stronger than that of OTL2943 Spring (2) at any combinations of the ASA speed and the shutter speed at F16.

b. Meter drum stops functioning when Chainlet and/or Meter drum does not smoothly.

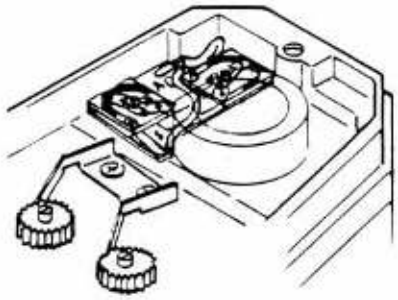
c. Underexposure warning mark must function smoothly so as not to affect the function of Meter drum.

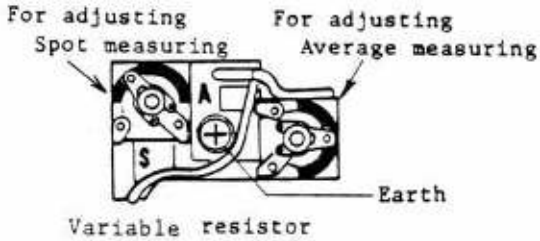
D. Adjusting the meter

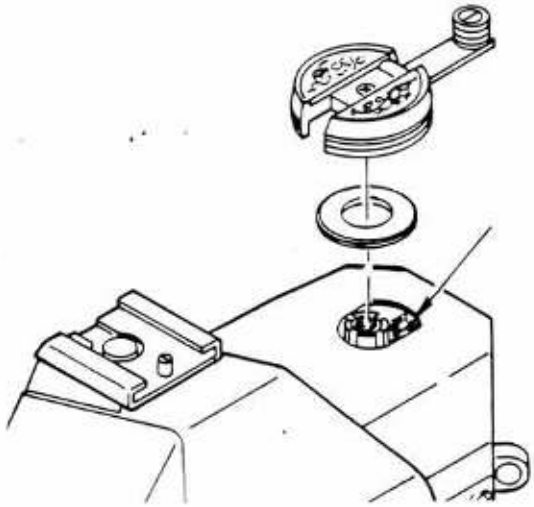
1) Fine adjustment

a. Before repairing check to see whether the voltage of the battery used exceeds 1.56V (1.58V under normal condition)

b. For both spot and Average metering can be adjusted by moving Variable resistor 180° turn of the adjusting lever varies by approximately 0.8 step after removing Bottom cover.





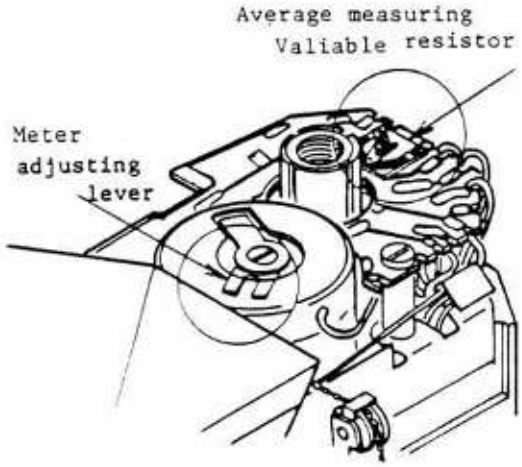


C. Average metering can be adjusted by moving Variable resistor on Printed circuit with resistor without removing Top cover.

2) Major adjustment

a. Remove Top cover and confirm that soldering is good.
The turn of meter adjusting lever make spot and Average metering change.

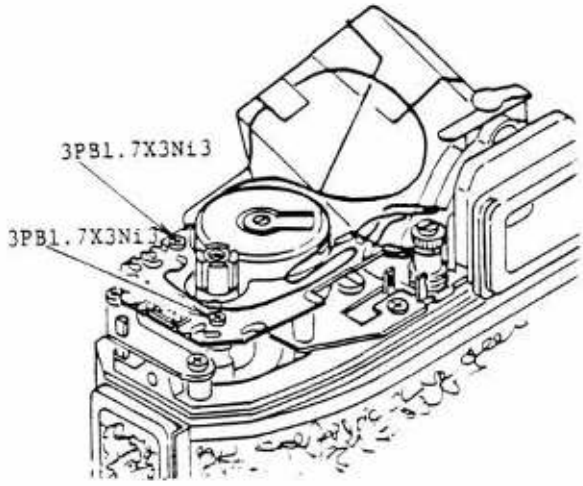
b. In case more than 1 step adjustment is required.
adjust the meter by changing the position of wrapping Chainlet round Meter drum.
(Refer to item of replacing Meter drum.)



E. Repairing immovable meter needle

A. Immovable meter needle for both Spot and Average

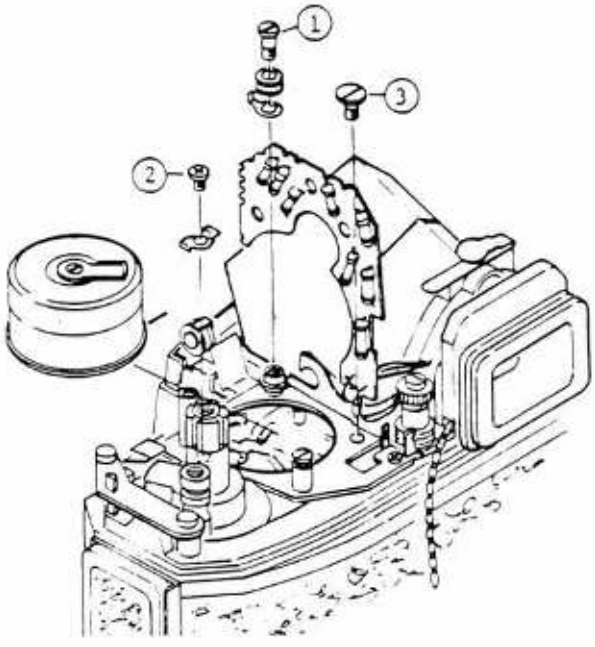
1. Remove the soldered wires on Meter drum and check whether the meter needle deflects with a circuit tester.
2. Replace Meter drum when the meter needle does not deflect.
3. When the meter needle deflects, the wires are disconnected or short-circuited.



B. Immovable meter needle for either Spot or Average

1. Remove the soldered wires for defective CdS and check the conduction with a circuit tester.
2. Replace CdS when there is no conduction. (Refer to items of Replacing CdS for Spot and Average.)
3. When there is the conduction, the leads or wirings on Printed circuit are disconnected or short-circuited.

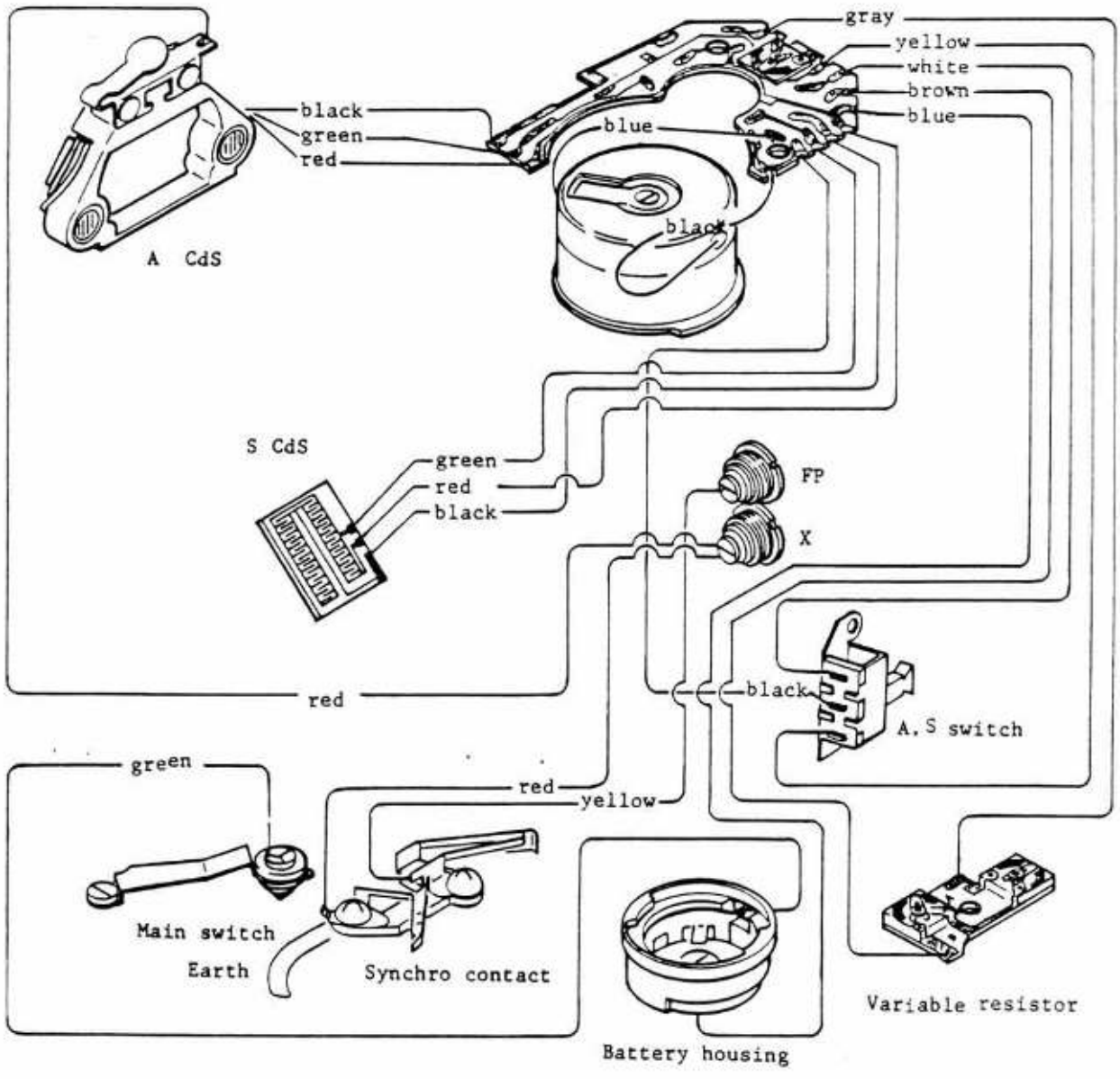
Note: When 3PB1.7x3Ni3 Setscrew is loose, the meter needle deflects to high luminance. So tighten Setscrew.



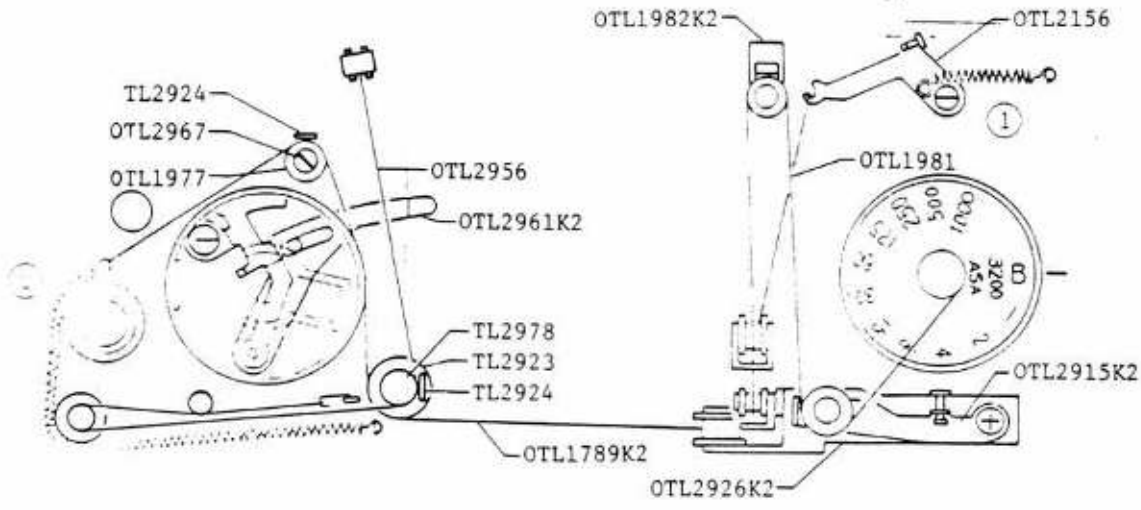
F. Replacing Meter drum

1. Unsolder the wires connected with Meter drum on Printed circuit with resistor.
2. Remove 3PB1.7x3Ni3 Screw as CdS for Average is attached.
3. Remove OTL2943 Spring from Chainlet and Chainlet from Meter drum.
4. Remove Screw OTL2967 Screw (1) PB1.7x2 Screw (2) and TL2955 Screw (3) Then pull out Meter drum cautiously to the direction of the side so as not to damage the meter needle.
5. When assembling Meter drum, proceed it in the reverse order outlined above.

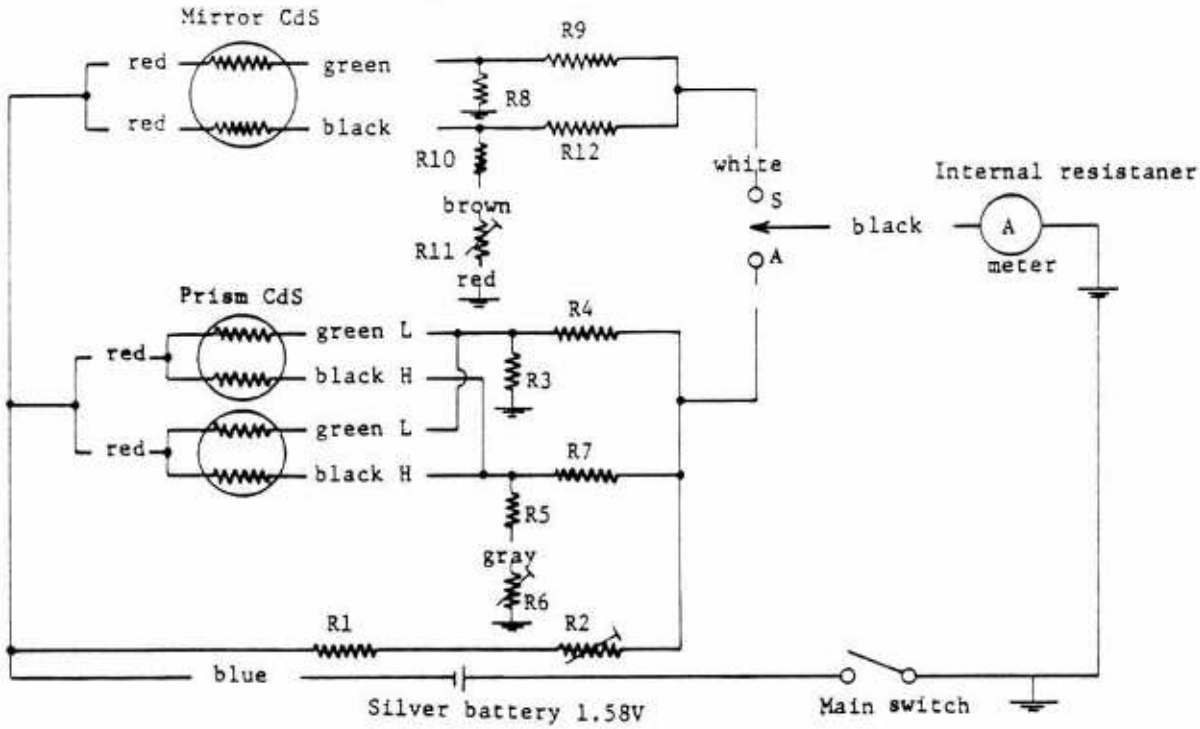
G. Electric Circuit Diagram

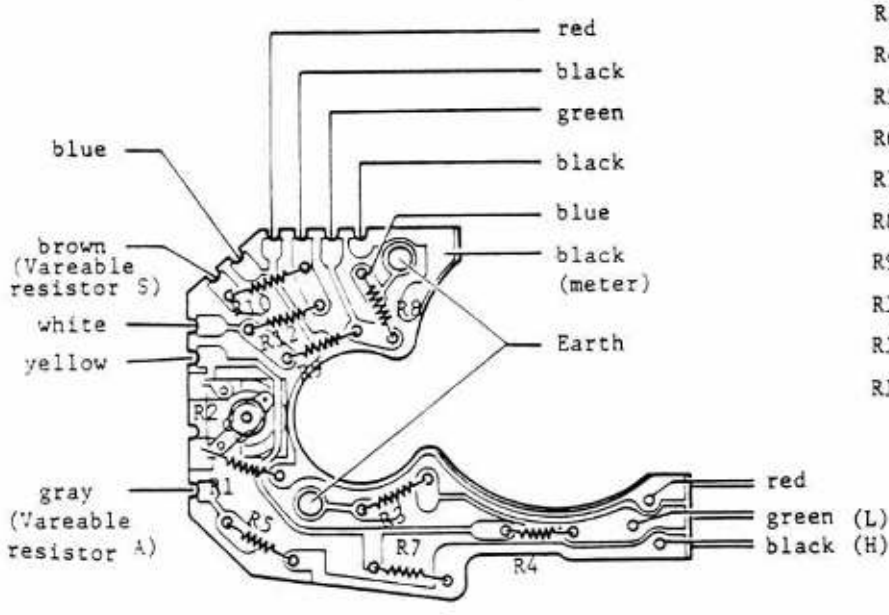


H. Parts on the Functions of Meter drum and Underexposure warning mark.



I. Exposure Meter Circuit Diagram





Resistance Values

R1	100
R2	500
R3	26— 70
R4	13— 15
R5	13-- 2.1
R6	2
R7	11
R8	21— ∞
R9	16— 17
R10	1.5- 4.5
R11	2
R12	11-- 12

J-1. Adjusting the exposure meter at full aperture metering for DSX

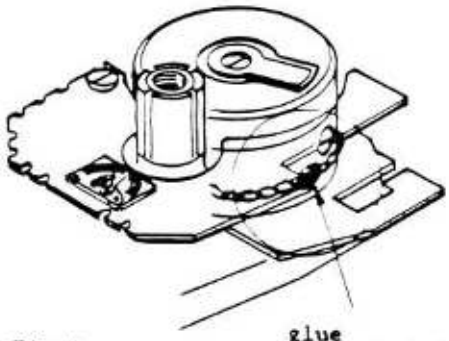


Fig.A

1. Wrap Chainlet round Meter drum so as to satisfy the following conditions and fix them by applying glue (quick dry type) at the position as shown in Fig. A.

Aperture	ASA speed	Shutter speed	Underexposure warning mark
Open	100	1/2→1	Appear
Open	100	1→1/2	Disappear

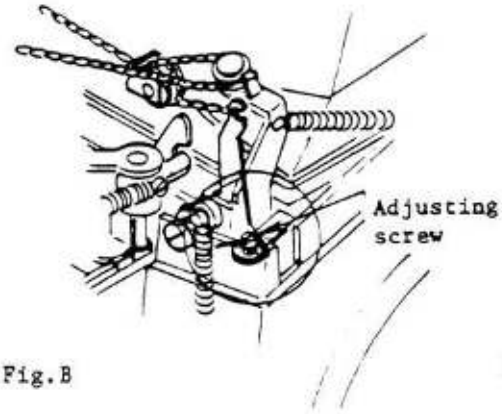


Fig.B

2. Adjust the position of OTL2156K2 Chainlet lever assembly by turning OTL2165 Adjusting screw so that Chainlet lever assembly does not touch other parts at the following condition.

Aperture: 16
ASA speed: 25
Shutter speed: 1/1000

3. Adjustment of the Spot metering must be done before adjusting the Average metering.

Exposure value	Aperture	ASA speed	Shutter speed	A/S switch
7	F5.6	100	1/4	S
11	F5.6	100	1/60	S
15	F5.6	50	1/500	S

Then adjust the Spot metering at each Exposure Value by turning Meter adjusting lever.

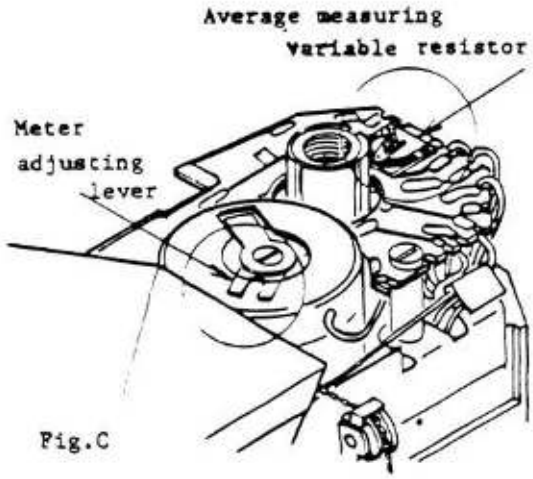


Fig.C

4. Adjustment of the Average metering.

Exposure value	Aperture	ASA speed	Shutter speed	A/S switch
7	F5.6	100	1/4	A
11	F5.6	100	1/60	A
15	F5.6	50	1/500	A

Then adjust the Spot metering at each Exposure Value by turning Meter adjusting lever.

J-2 Adjusting the exposure meter at full aperture metering for MSX

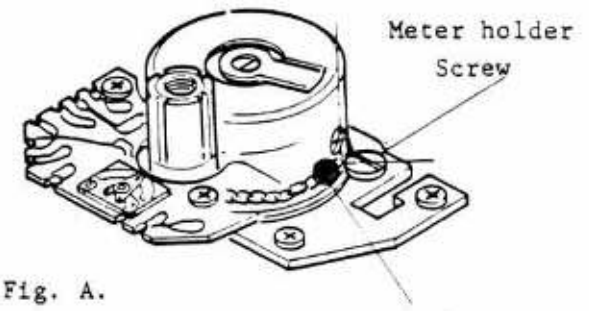


Fig. A.

1. *Wrap Chainlet round Meter drum so as to satisfy the following conditions and fix them by applying glue (quick dry type) at the position as shown in Fig. A.*
   Aperture F1.8 ASA speed 100
   shutter speed 1 sc.

Note: In this case the screw of Meter drum. Must align with Meter holder screw.

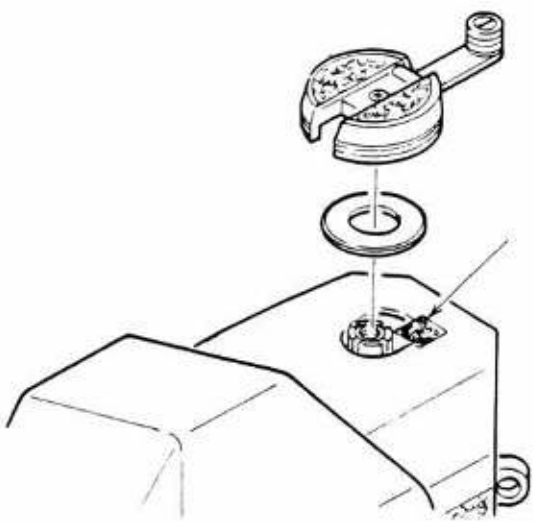


Fig. B.

Fine adjustment can be done by moving Variable resistor on printed circuit with resistor without removing Top cover. as shown in Fig. B.

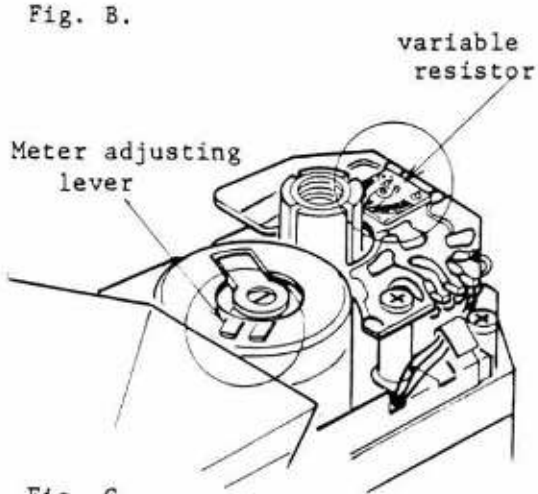
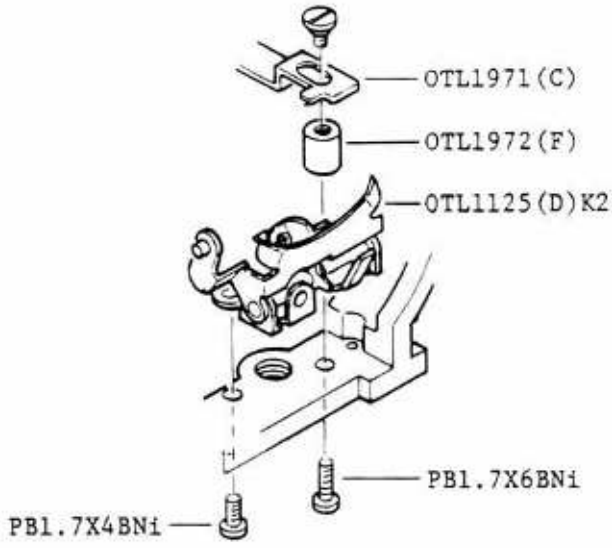


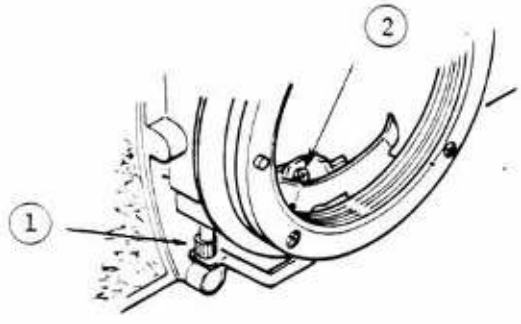
Fig. C.

Set the aperture to F5.6, ASA speed 100, Shutter speed 1/60 Then adjust the spot metering at Exposure Value 11 by turning Meter adjusting lever. as shown in Fig. C.

K. Adjusting the exposure meter at stopped down metering

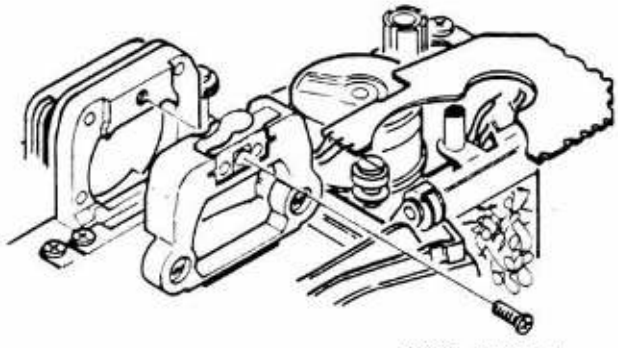


To make the adjustment for stopped-down measuring easy and to increase durability of Coupling plate assembly.



Adjustment can be done by turning Nut 1 or Screw 2 Please refer to Page 27 for Adjusting the expossure meter at stopped-down metering.

L. Replace CdS for Average



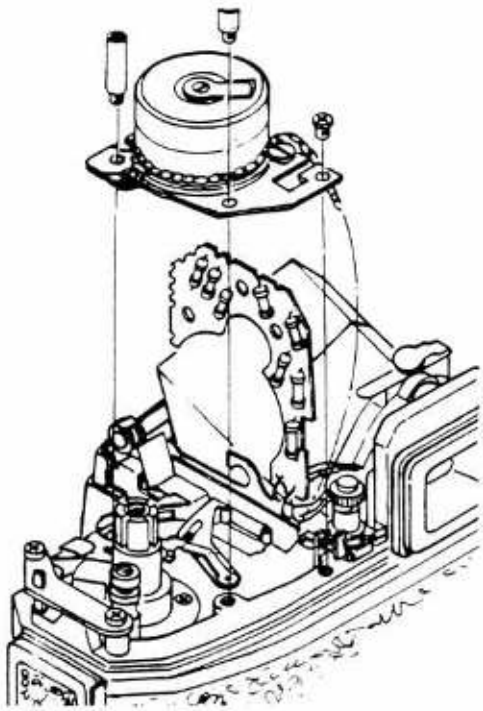
3PB1.7X6BNi

CdS for Average was modified in June, 1974 due to the modification of mirror housing assembly.

So far it was fitted in the eyepiece frame of mirror housing assembly, but it has been tightened with 3PB1.7X6BNi Screw.

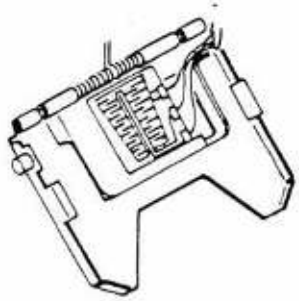
So remove Screw before replacing CdS for Average.

M. Replacing CdS for Spot

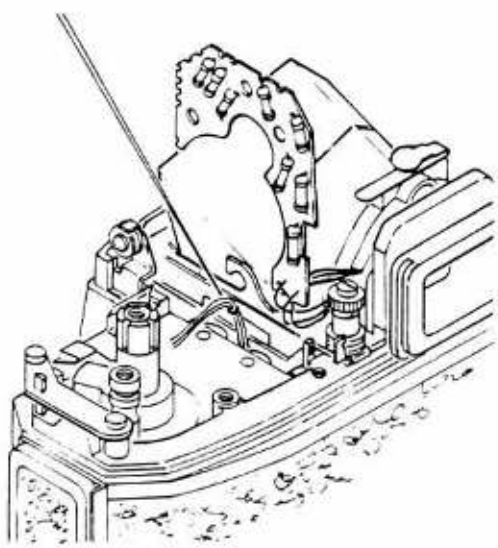


A. Removing procedure

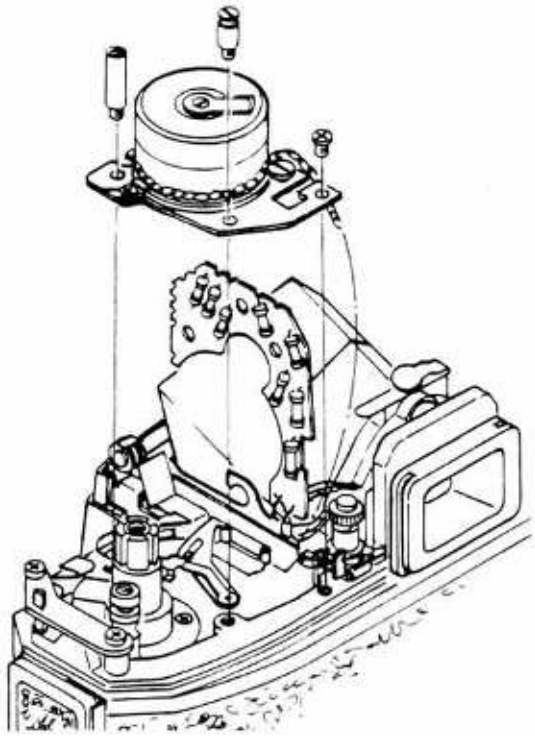
1. Unsolder the wires connected with CdS for Spot on Printed circuit with resistor.
2. Remove Screw built into Printed circuit with resistor and pull up Meter drum so as to remove it easily.
3. Remove Meter base plate with Meter drum and Chainlet.
4. Remove Underexposure warning mark, OTL2975K2 Cover and Mirror.
   (Refer to item of Replacing Mirror.)
5. When removing CdS, apply a small quantity of ketone to the circumference of CdS and bundled part of the wires on Mirror holder.
6. Pull out CdS with the wires in the direction of Lens mount.



B. Assembling procedure



1. Pull out the leads of CdS from the slit of the rear side of Mirror housing using Tool T-14 Adjusting driver as shown in figure.
2. Apply cement to the dent of Mirror holder and attach CdS to the part.
3. Put Mirror in it.
4. Connect the three wires jutting from Mirror housing with the body as shown in figure.
5. Solder the wires in reverse order outlined in the removing procedure.
6. Adjust the meter.



N. Replacing Underexposure warning mark

Remove Meter base plate with Meter drum and Chainlet before replacing Underexposure warning mark.

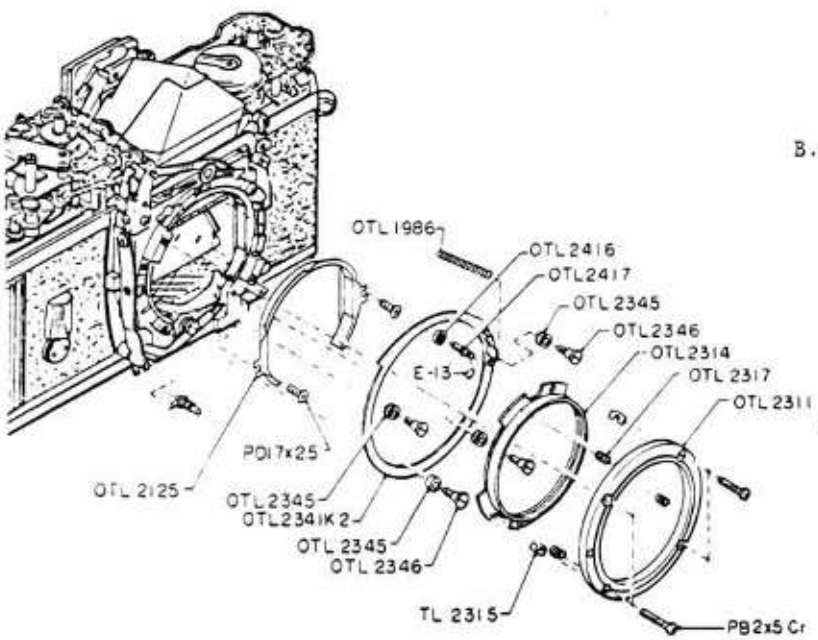
O. Removing and attaching OTL2341K2 Aperture linking ring

A. Removal

Remove Front cover, Lens mounting ring and OTL2346 Screw before removing Aperture Linking ring.

B. Attachment

1. Fix OTL2345 Ring roller as shown in figure.
2. Adjust looseness of Aperture linking ring by using Ring roller described below.



U P

te: 1. Aperture linking ring must not come into contact with others except 5 pieces of Ring roller when being moved.

2. Aperture linking ring must be loose a little bit when being moved up and down, and/or right and left.

5. Mirror housing mechanism

A. Function of OTL2100 Mirror housing

1. Mirror housing can be set by ① TL2151K2 Mirror lever assembly as shown in Fig. A.

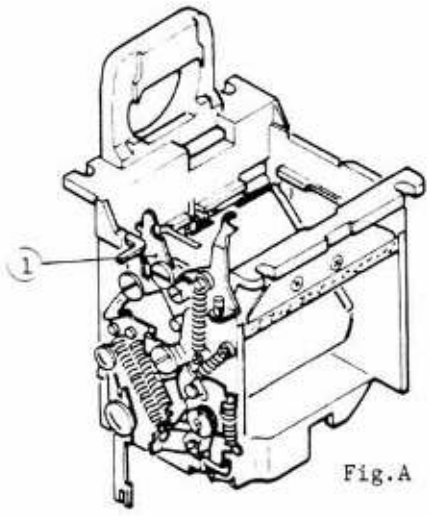


Fig.A

2. When pressing Shutter release button, the following operations will occur continuously as shown in Fig. B.

a. ② TL2177 Diaphragm release lever is pushed down.

b. ③ TL2136K2 Mirror operating lever operates and Mirror rises.

c. ④ OTL2331K Linking lever operates and OTL1125K2 Aperture linking plate operates.

d. ⑥ TL2171 Shutter release lever operates and the shutter starts operating.

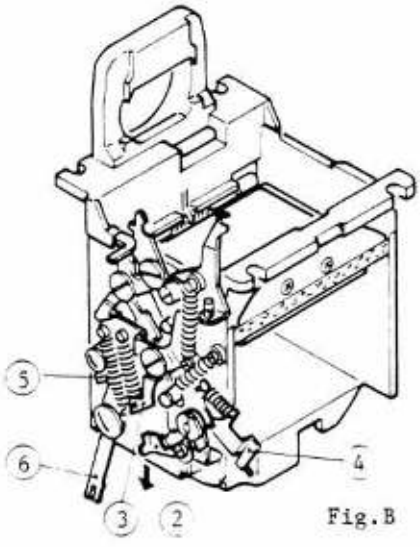


Fig.B

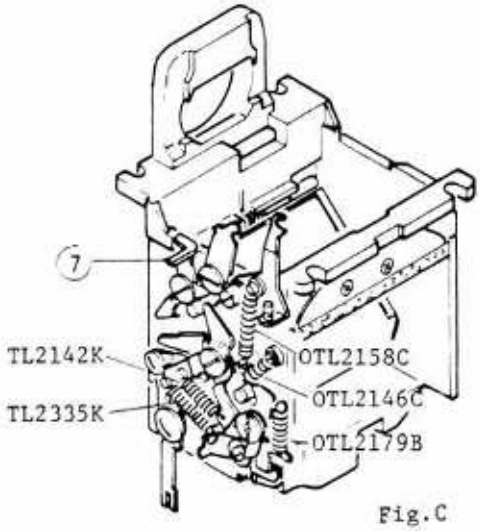
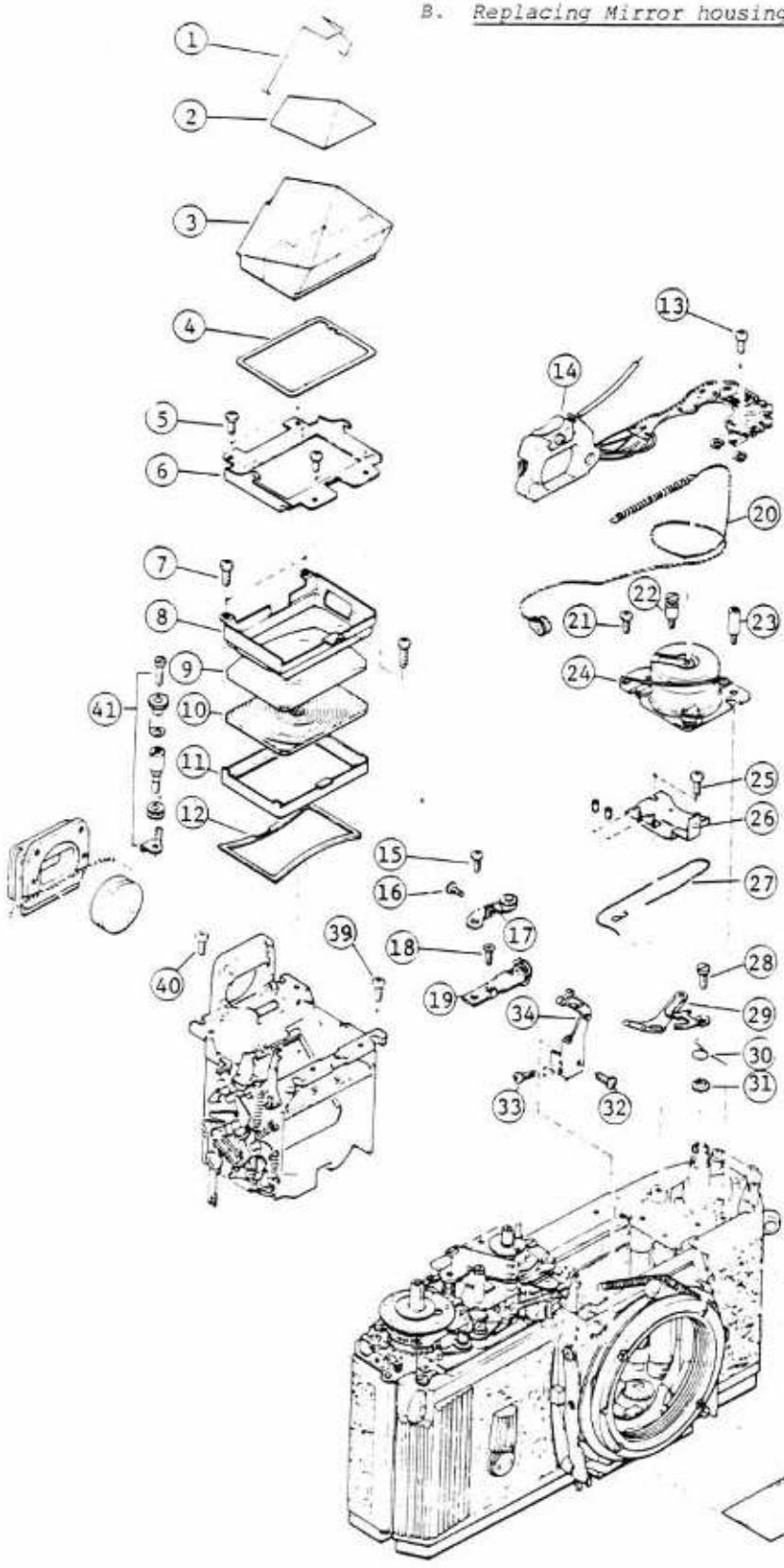


Fig.C

e. ⑦ TL2161 Release lever pushes down Mirror when the shutter operation finishes as shown in Fig. C.

Note: Do not try to remove the screws built into Mirror housing as they are rivetted after being screwed in.

B. Replacing Mirror housing



1. *The Arabic numeral in a circle indicates the procedure of removing.*

2. *Unsolder the wires connected with printed circuit with resistor when removing 14. (Refer to item of Repairing Meter drum.)*

3. *Remove Setscrew 39, 40 and 37 and set Shutter speed cam assy. to 1/500 or 1/1000.*

   Then loosen TL1759 Screw tightening TL1753K2 Slow speed arm assy. and place Slow speed cam assy. on Shutter speed can assy.

   And pull out Mirror housing.

4. *Assemble Mirror housing in the reverse order of the Arabic numeral in a circle.*

6. Flange back and view finder

A. Adjusting the flange back

The Flange back of the camera body is $44.5\ \text{mm}.\ ^{+0}_{-0.03}$

1. Place OTL2318K2 Lens lock pin assembly and OTL2314 Screw mount ring in the body.
2. Apply cement to OTL2317 Spring and attach Spring to OTL2311 Lens mount.
3. Tighten 4 pieces of PB2x5Cr3 Screw.
4. Place Tool T-1 Camera body supporter on U-1 Measuring instrument with dial gauge and Tool T-2 Standard gauge block on Camera body supporter.
5. Set the hand of the dial gauge to "0" as shown in Fig. B.

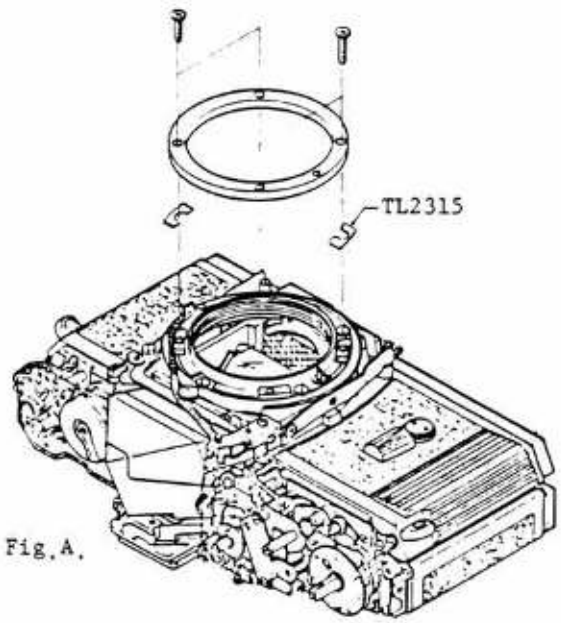


Fig.A.

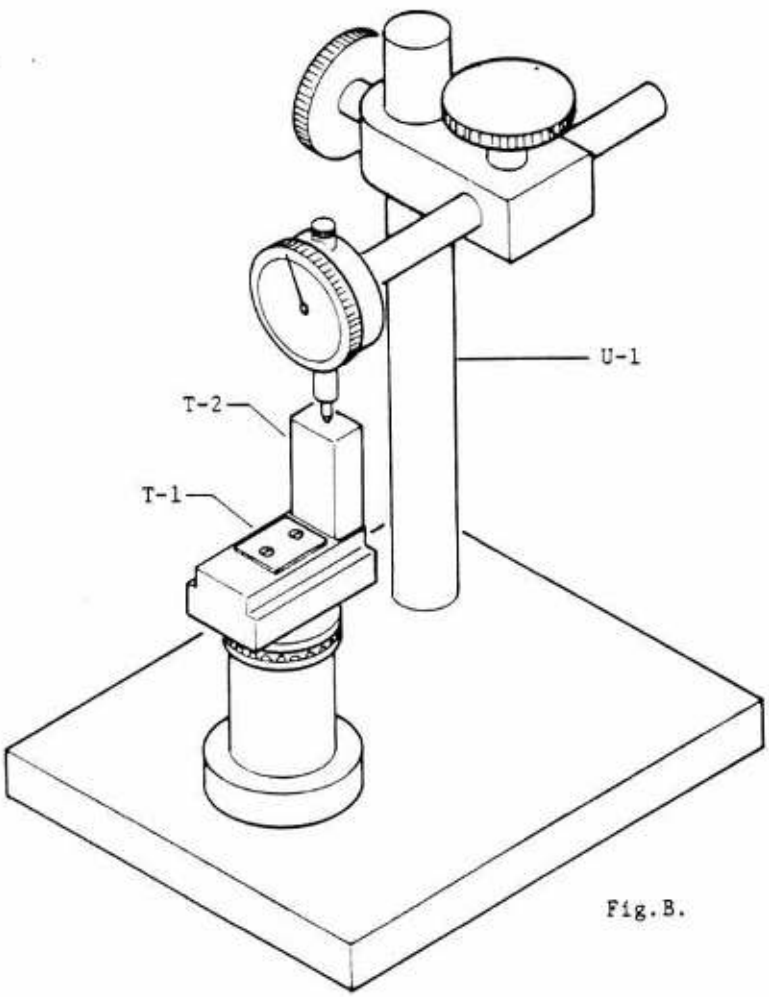


Fig.B.

6. Take Standard gauge block off Camera body supporter.

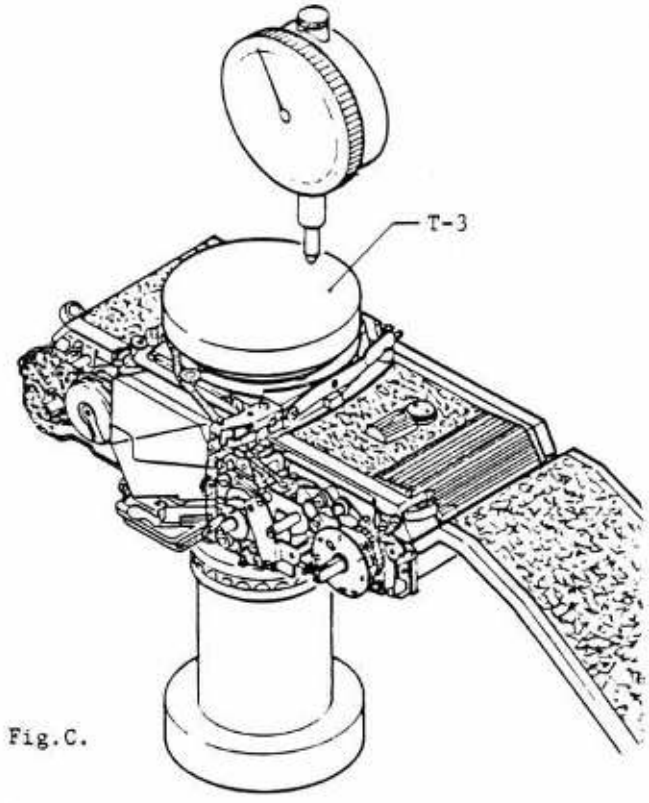


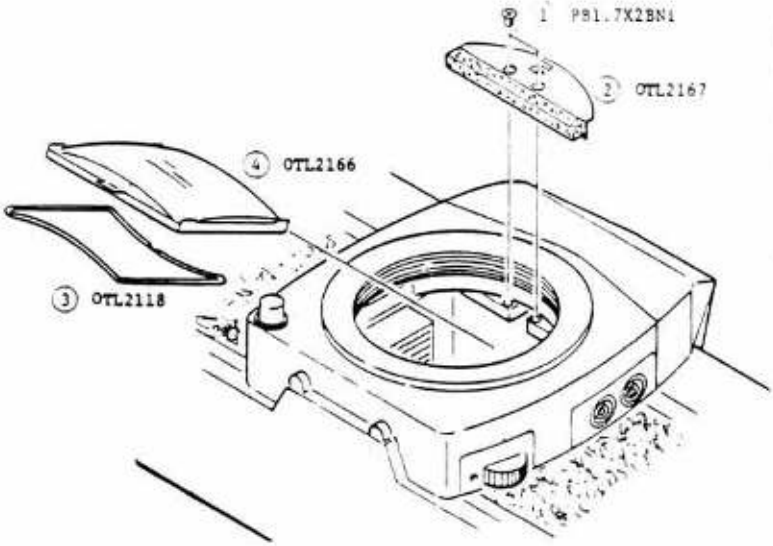
Fig.C.

7. Place the camera body on Camera body supporter and Tool T-3 Lens mounting gauge on Lens mounting ring.

8. Measure the flange back turning the camera body.
   If necessary, loosen Screw and adjust the flange back by using TL2315 Washer (0.03, 0.05 and 0.1 mm thick).

B. *Adjusting Focus of View finder*

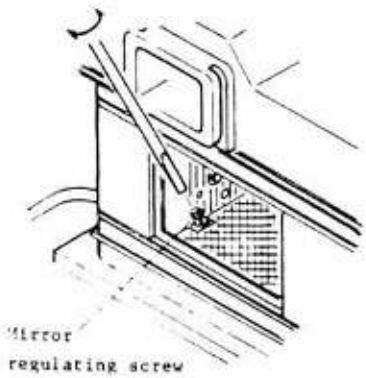
1. *Dust off View finder*



Mirror housing assembly was modified in June 1974 in order to enable Fresnel frame to be removed without removing Top cover.

a) The Arabic numeral in a circle indicates the procedure of removing.

b) Install in the reverse order of removing.



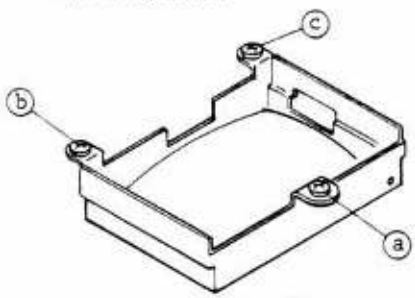
2. *Adjusting Focus of View finder*

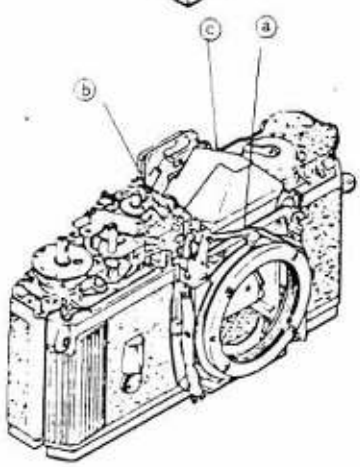
a) Confirm the length of the flange back (44.5mm). (Refer to item of Adjusting the flange back.)

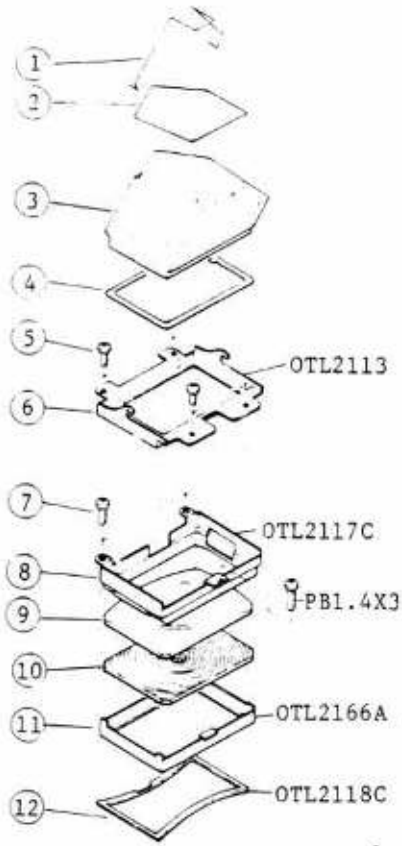
b) Fine adjustment of the finder focus can be done by turning mirror regulating screw when needed.

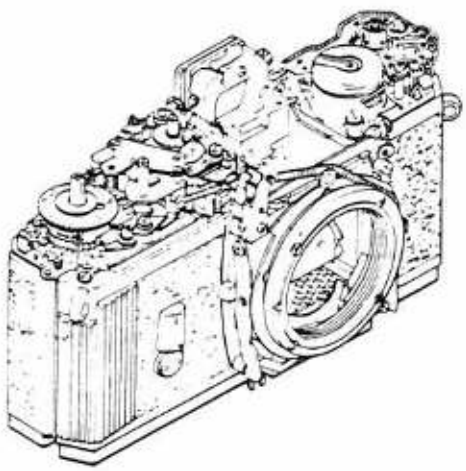
c) Adjust the focus of the view finder by equivalently turning PB1.4x3BNi Screw a , b and c built into Condenser frame.

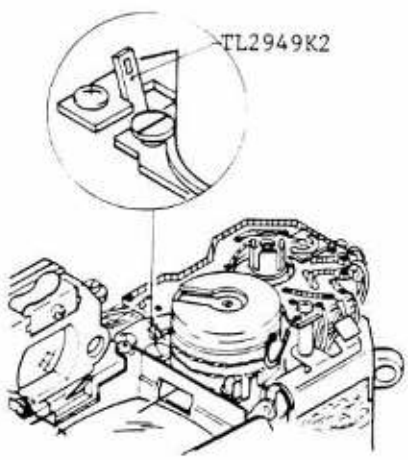
d) Fix Screw a , b and c by applying gule.











C. *Replacing OTL2117 Condenser frame*

A. *Removing procedure*

1. *Remove TL2112K2 Penta prism and OTL2113 Penta prism frame.*
2. *Catch the bar of TL2949K2 Indication assembly facing A/S indicator in the out of Meter base plate*
3. *Remove 3 pieces of PB1.4x3BNi Screw and Condenser frame taking care not to damage the needle on Meter drum.*

B. *Attaching procedure*

Attach Condenser frame in the reverse order as outlined above.

Note: Adjust the focus of the view finder with 3 pieces of PB1.4x3BNi Screw.
After adjusting, fix Screw by applying glue.
(Refer to item of Adjusting the focus of the view finder.)

D. Replacing TL2133 Mirror

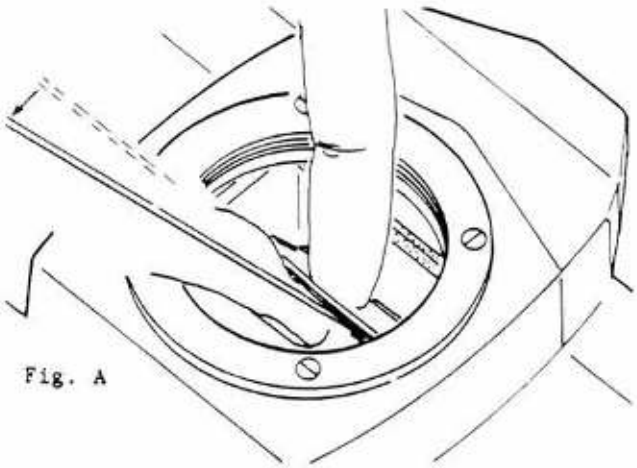


Fig. A

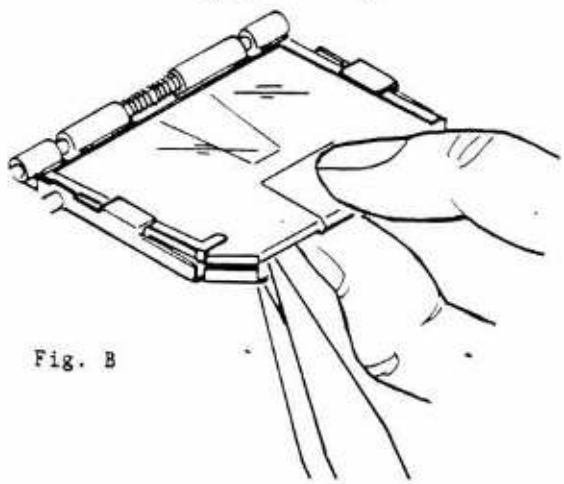


Fig. B

A. Removing procedure

1. Insert the tip of tweezers into the left tip of Mirror holder.
2. Catch the center of Mirror with the fingers using a soft paper as shown in Fig. B.
3. Pull out Mirror lifting it slightly.
4. When removing TL2124 Retaining spring, shift the tip of it to the inside and then take it off the hook of Mirror holder taking care not to touch OTL2116 Fresnel lens.

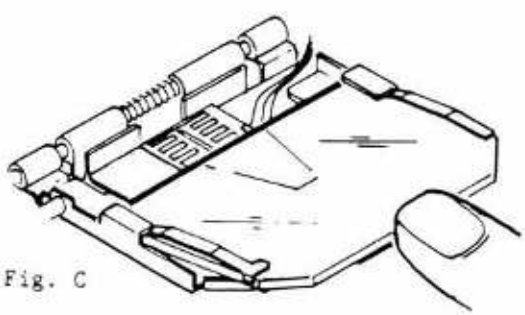


Fig. C

B. Attaching procedure

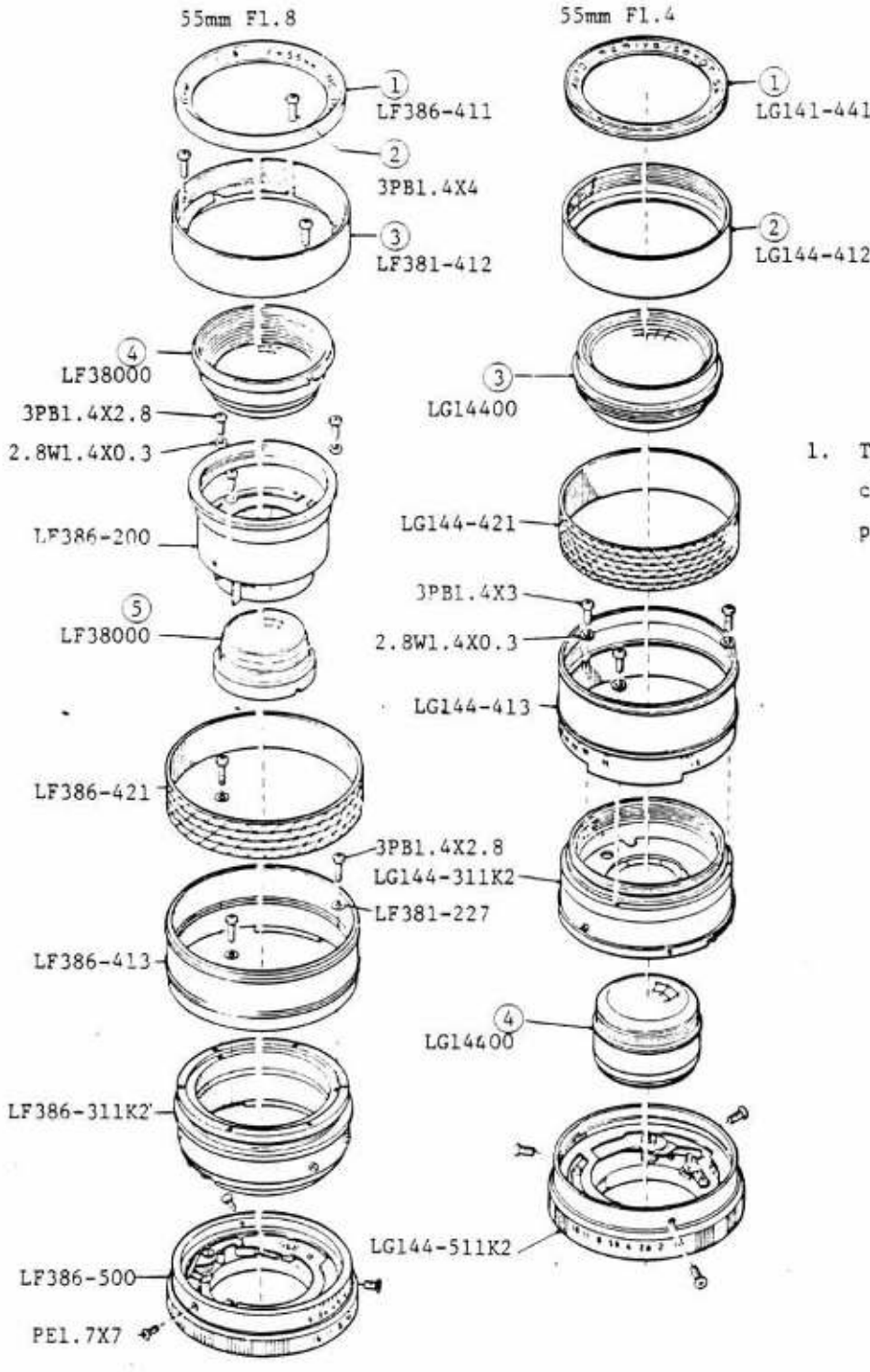
1. Attach Mirror to Retaining spring as shown in Fig. C.
2. Slide Mirror with Retaining spring into Mirror holder taking care not to push the wires.
3. Fix Mirror by pressing the tip of it lifting the tip of Retaining spring on the right side.

Note: 1. Confirm the focus of the view finder and accuracy of the meter for Spot whenever replacing Mirror.

2. Be sure to stick TL2216 Black paper after replacing Mirror.

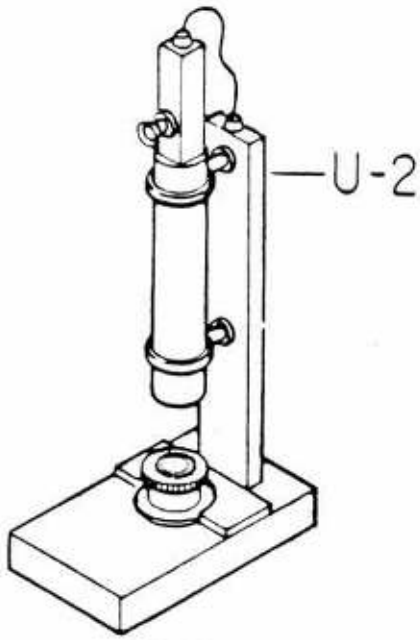
7. Lens

A. Removing the lens and Filter ring

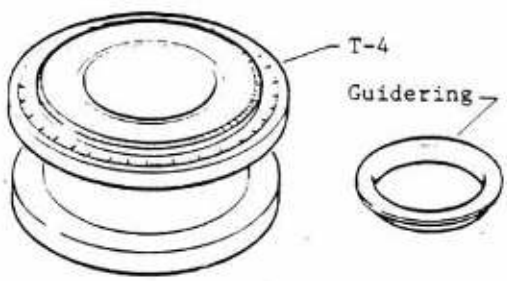


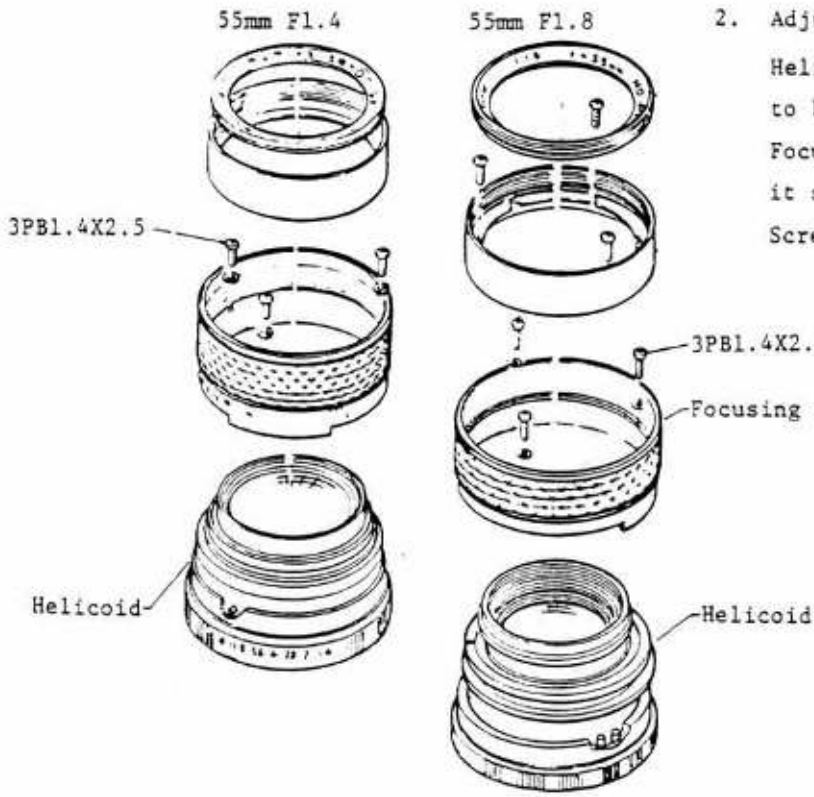
1. The Arabic muneral in a circle indicates the procedure of removing.

B. Adjusting the lens focus.



1. Place T-2 Lens infinity check supporter on U-2 Auto Collimator Model Vertical type.





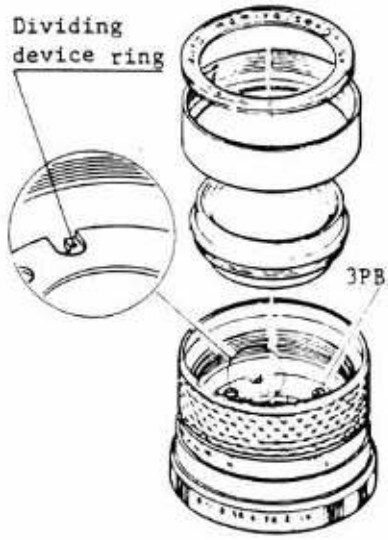
2. Adjust the infinity by move Helicoid and attach Focusing ring to Lens assembly. Then move Focusing ring clockwise until it stops and fix 3PB1.4X2.5BNi Screw at the position.

C. Adjusting the aperture

55mm F1.8

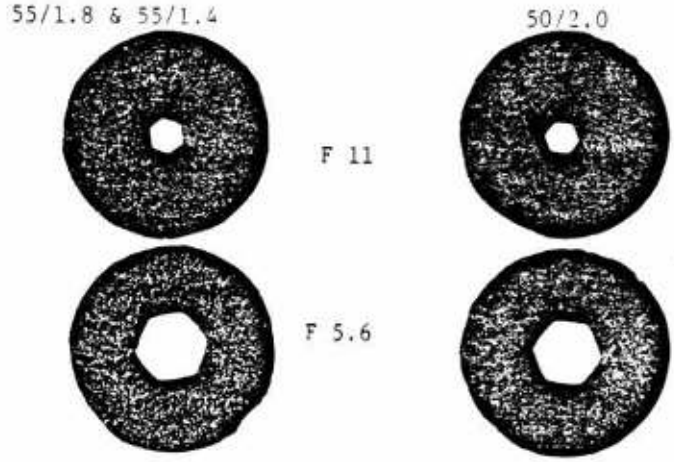
1. For F1.8 and F2.0 lens
   a. Remove Name ring and Filter ring.
   b. Loosen 3PB1.4X2.5 BNi Screw.
   c. Adjust the aperture size by moving Diaphragm barrel assembly so that the size coincides with that of the figures shown.
   d. Fix 3PB1.4X2.5 BNi Screw at the position.
   e. Attach Filter ring and Name ring.

55mm F1.4



2. For F1.4 lens
   a. Remove Name ring, Filter ring and Front lens.
   b. Loosen 3PB1.4X2.5BNi Screw slightly.
   c. Adjust the aperture size by moving Dividing device ring.
   d. Fix 3PB1.4X2.5BNi Screw.
   e. Attach Front lens, Filter ring and Name ring in order.

Aperture size seen from lens front.



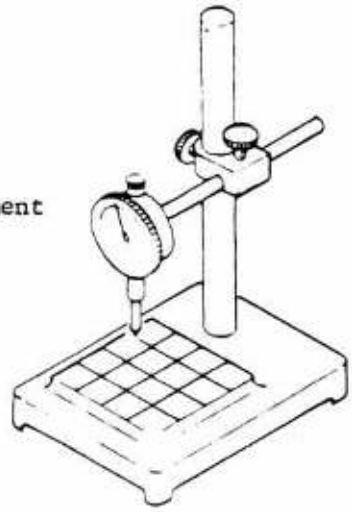
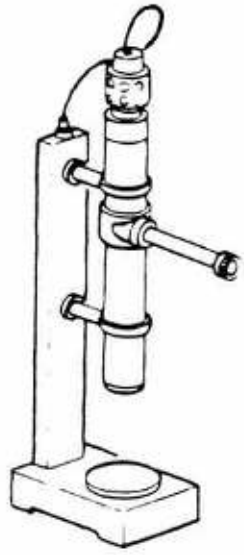
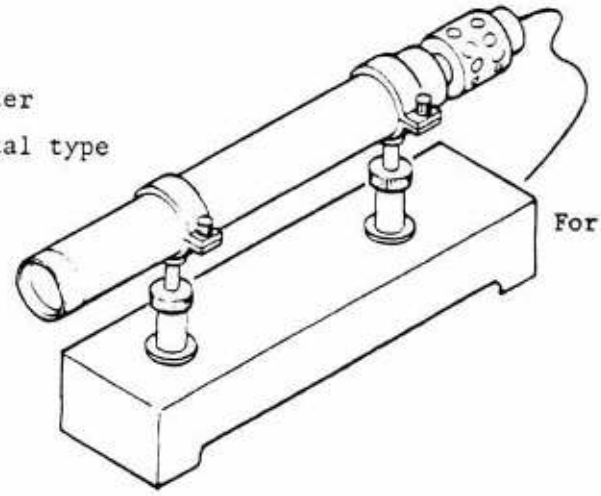
Repair Tool List and
Special Measuring Instrument List

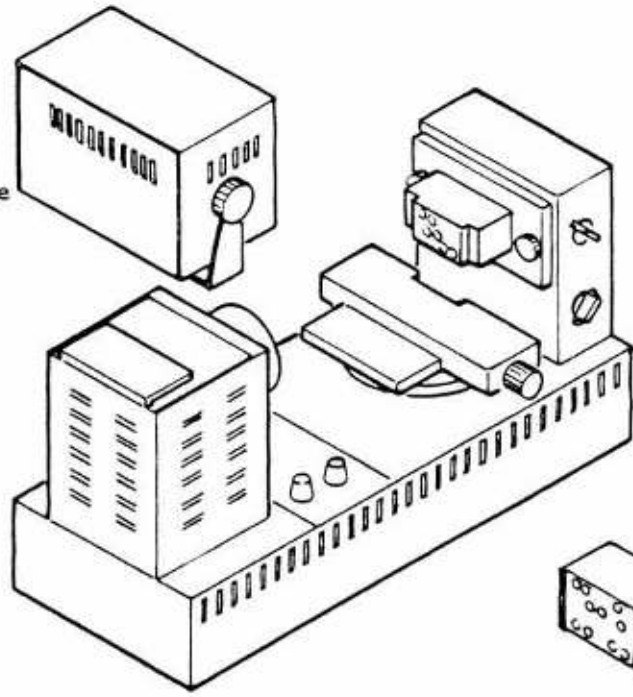
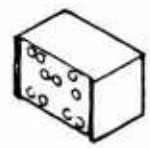
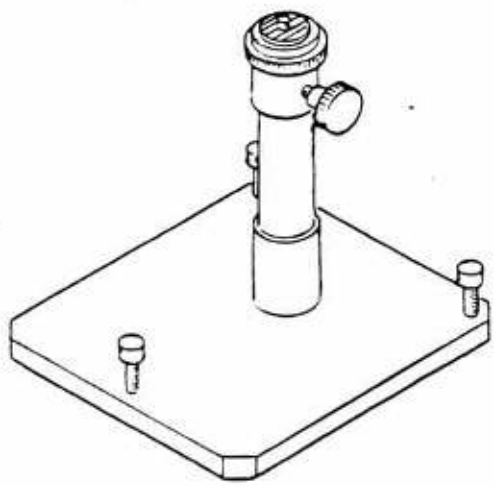
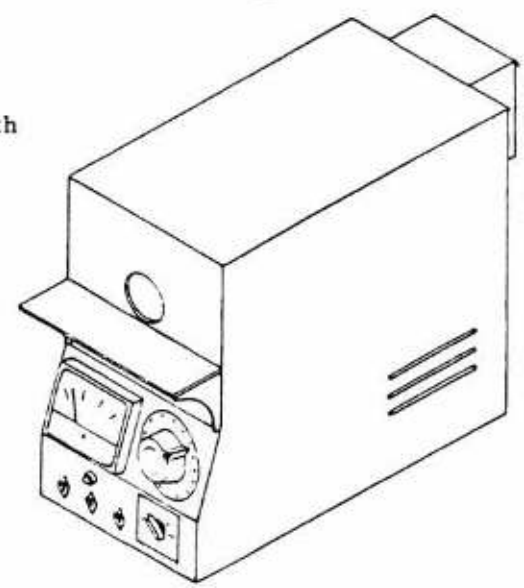
R.M.1976-9

MEASURING INSTRUMENTS FOR AIL CAMERA LINES

OF

MAMIYA CAMERAS

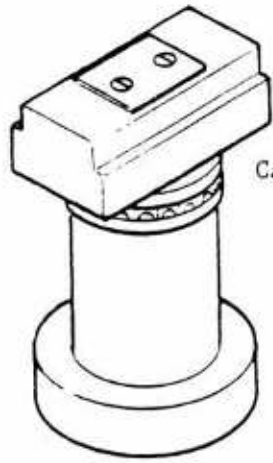
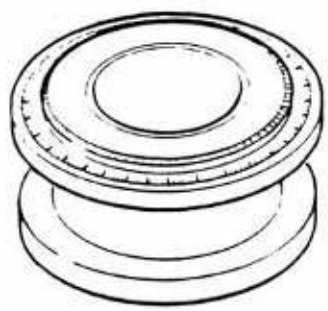
Instrument No.	Description and Use	Delivery period
U-1 Measuring instrument with dial gauge		2 months For checking flange focal distance and parallel of lens mounting
U-2 Auto collimeter Vertical type		3 months For inspection of lens infinity
U-3 Collimeter Horizontal type		3 months For inspection of lens and finder infinity

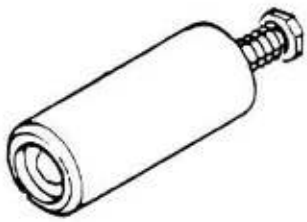
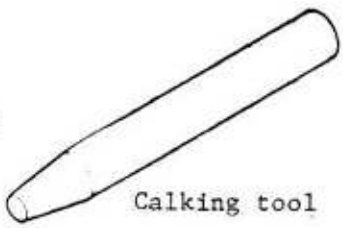
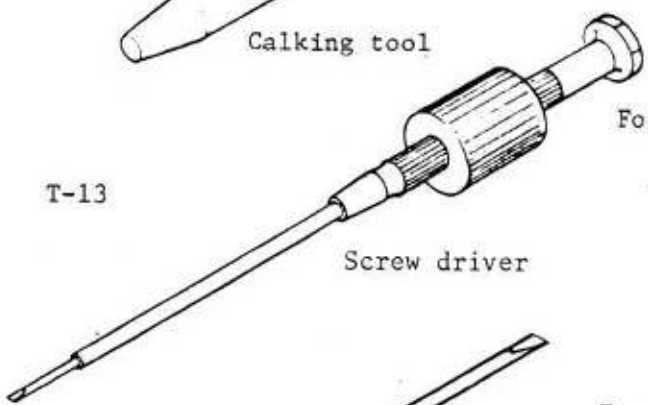
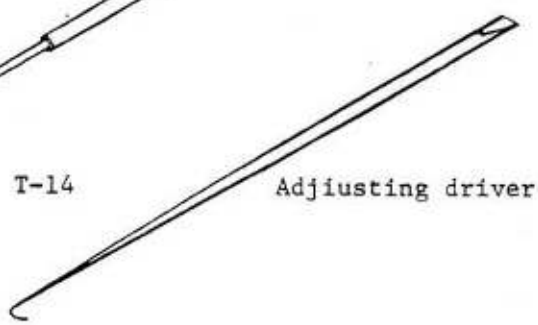
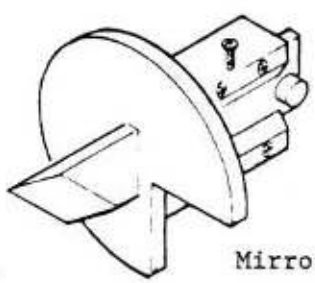
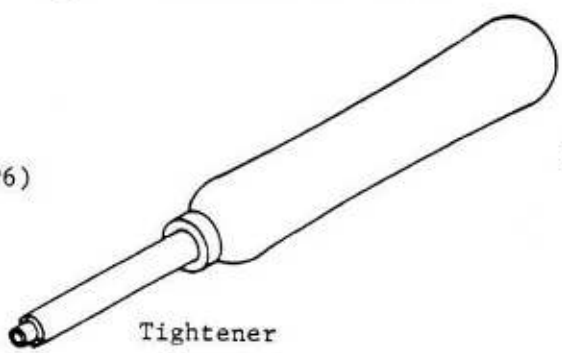
Instrument No.	Description and Use	
U-4 Shutter tester Pulse counter type Model FL-400M2		2 months For checking shutter speed of the focal plane shutter and lens shutter types
		For M645 camera adapter
U-6 Camera body supporter		2 months
U-7 Light source box with Stabilizer, Voltage meter, Slide regulator Model LB360		3 months For checking exposure meter sensitivity

SPECIAL TOOLS AND MEASURING INSTRUMENTS

FOR

MAMIYA TL. DTL AND DSX. MSX CAMERA

Instrument No.	Description and Use	Delivery period
T-1 (S-1)	 Camera body supporter For checking parallel of lens mounting panel (Exclusively used for Inst. No. U-1)	2 months
T-2	Standard gauge block (Exclusively used for Inst. No. U-1, T-1, and T-3)	2 months
T-3	Lens mounting gauge	2 months
T-4 (X-4)	 Lens infinity focusing check supporter (Exclusively used for Inst. No.U-2) Guide ring Used the guide ring for TL, DTL, and DSX,	3 months
T-5	Standard lens	

Tool No.	Description and Use	Delivery Period
T-11	 Spanner	2 months For tightening and loosening the winding nut TL1328
T-12	 Calking tool	1 months For calking the hub of Start wheel TL1455K2
T-13	 Screw driver	1 months For tightening Coupler TL1614 screw
T-14	 Adjiusting driver	1 months For Speed adjusting lever TL1745K2 and spring anchor
T-15	 Mirror angle gauge	2 months
T-16 (T-DWP6)	 Tightener	1 months For tightening flash terminal

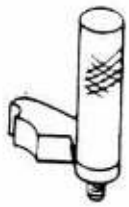
T-17

1 months

For tightening and loosening
the rewind button
same XTL

Rewind button pin-faced screw driver

T-18



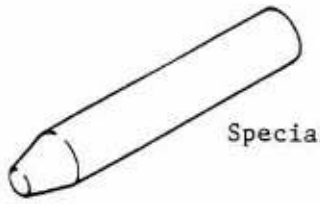
2 months

For Front curtain cam TL 1724K2

Ref. Service Manual for DSX and DTL

Front curtain cam locating gauge

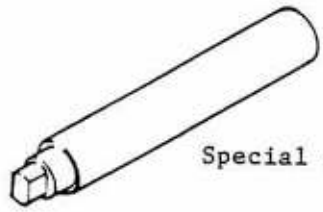
T-19



For IWP-1724K2

Special punch

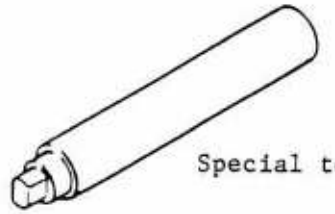
T-20



For IWP-1224K2

Special tool

T-21



For IWP-1455K2

Special tool